United States
Department of
Agriculture

Science and
Education

1985 Budget

Explanatory Notes

Agricultural Research Service

AGRICULTURAL RESEARCH SERVICE

Purpose Statement

Agricultural Research Service was established on November 2, 1953, pursuant to authority vested in the Secretary of Agriculture by 5 U.S.C. 301 and Reorganization Plan No. 2 of 1953, and other authorities.

The research performed by Agricultural Research Service (ARS) is authorized by the Department of Agriculture Organic Act of 1862 (5 U.S.C. 511), the Research and Marketing Act of 1946, as amended (7 U.S.C. 427,1621), the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3101, 3222) and the Agriculture and Food Act of 1981 (7 U.S.C. 1281).

Agricultural Research Service is responsible for conducting basic, applied and developmental research on:

--Animal production
--Plant production
--Use and improvement of soil, water, and air
--Processing, storage, distribution, food safety, and consumer services
--Human nutrition research

The research applies to a wide range of goals; commodities; natural resources; fields of science; and geographic, climatic, and environmental conditions.

As the U.S. Department of Agriculture's in-house agricultural research agency, ARS has major responsibilities for conducting and leading the national agricultural research effort. ARS provides initiative and leadership in five areas:

* Research on broad regional and national problems.
* Research to support Federal action and regulatory agencies.
* Expertise to meet national emergencies.
* Research support for international programs.
* Scientific resource to the Executive Branch and Congress.

The mission of ARS research is to develop new knowledge and technology which will insure an abundance of high quality agricultural commodities and products at reasonable prices to meet the increasing needs of an expanding economy and to provide for the continued improvement in the standard of living of all Americans. This mission focuses on the development of technical information and technical products which bear directly on the needs to (1) manage and use the Nation's soil, water, air, and climatic resources, and improve the Nation's environment; (2) provide an adequate supply of agricultural products by practices that will maintain a permanent and effective agriculture; (3) improve the nutrition and well-being of the American people; (4) improve living in rural America; and (5) strengthen the Nation's balance of payments.

Research is conducted at numerous field locations in the States, District of Columbia, Puerto Rico, the Virgin Islands, and in several foreign countries. Much of the work is conducted in direct cooperation with the State agricultural experiment stations, other State and Federal agencies, and private organizations.

Central offices of ARS are in the Washington, D.C. Metropolitan Area. The field activities are managed on a national basis through four Regional Offices and 11 Area Offices. Activities are carried out at 140 separate field locations. As of September 30, 1983, there were 7,509 full-time employees and 1,063 other than full-time employees. Of the total, 342 full-time employees and 42 other than full-time employees worked in the headquarters office.

AGRICULTURAL RESEARCH SERVICE

Available Funds and Staff-Years

Actual 1983, and Estimated 1984 and 1985

Item	Actual 1983		Estimated 1984		Estimated 1985	
	Amount	Staff-Years	Amount	Staff-Years	Amount	Staff-Years
Direct Appropriation:						
Agricultural Research Service	$456,346,000	8,348	$471,958,400	8,402	$483,040,000	8,302
Morrill-Nelson Act	2,800,000	- -	2,800,000	- -	- -	- -
Buildings and Facilities	4,927,000	- -	27,725,000	- -	- -	- -
Total, Direct Appropriation	464,073,000	8,348	502,483,400	8,402	483,040,000	8,302
Deduct Allotments to Other Agencies:						
Forest Service	-376,000	-1	-386,000	-1	-386,000	-1
Net	463,697,000	8,347	502,097,400	8,401	482,654,000	8,301
Obligations from other USDA Appropriations:						
Agricultural Marketing Service	160,124	- -	160,000	- -	160,000	- -
Animal and Plant Health Inspection Service	3,292,532	65	5,900,000	76	5,900,000	76
Federal Grain Inspection Service	102,169	1	110,000	1	110,000	1
Food and Nutrition Service	510,216	- -	510,000	- -	510,000	- -
Forest Service	216,947	- -	226,000	- -	226,000	- -
Food Safety Inspection Service	1,378,469	- -	1,400,000	- -	1,400,000	- -
Office of International Cooperation and Development	660,974	6	700,000	6	700,000	6
Soil Conservation Service	491,686	8	500,000	8	500,000	8
Miscellaneous Reimbursements	341,624	8	729,000	- -	729,000	- -
Total, Other USDA Funds	7,154,741	88	10,235,000	91	10,235,000	91
Total, Agriculture Appropriations	470,851,741	8,435	512,332,400	8,492	492,889,000	8,392

Available Funds and Staff-Years

Actual 1983, and Estimated 1984 and 1985

Item	Actual 1983		Estimated 1984		Estimated 1985	
	Amount	Staff-Years	Amount	Staff-Years	Amount	Staff-Years
Other Federal Funds:						
Department of Defense..	474,749	10	1,300,000	10	1,300,000	10
Department of Energy...	1,273,460	5	2,300,000	5	2,300,000	5
Department of Health and Human Services...	678,861	6	800,000	5	800,000	5
Department of Interior.	873,969	9	600,000	7	600,000	7
Environmental Protection Agency....	715,853	2	900,000	2	900,000	2
Miscellaneous Reimbursement.....	1,194,367	- -	1,542,000	- -	1,542,000	- -
Total, Other Federal Funds.....	5,211,259	32	7,442,000	29	7,442,000	29
Non-Federal Funds:						
State of California....	454,907	1	143,000	1	143,000	1
State of Idaho.....	49,224	- -	- -	- -	- -	- -
State of Maryland.....	14,720	- -	- -	- -	- -	- -
Binational Agriculture Research & Development Agreement (BARD):	563,380	- -	572,000	- -	572,000	- -
Quarters and Subsistence.....	216,361	- -	216,000	- -	216,000	- -
Miscellaneous Reimbursement.....	326,408	1	1,392,000	1	1,392,000	1
Miscellaneous Contributed Funds....	1,376,613	15	2,000,000	15	2,000,000	15
Total, Non-Federal Funds.....	3,001,613	18	4,323,000	18	4,323,000	18
Total, Agricultural Research Service...	479,064,613	8,485	524,097,400	8,539	504,654,000	8,439

Full-Time Equivalent Staff-Years:	1983 Actual	1984 Estimated	1985 Estimated
Ceiling.....	8,335	8,389	8,289
Non-Ceiling.....	150	150	150
Total.....	8,485	8,539	8,439

AGRICULTURAL RESEARCH SERVICE

Permanent Positions by Staff-Year Summary

1983 Actual, 1984 Estimate and 1985 Estimate

Grade	1983 Actual			1984 Estimate			1985 Estimate		
	Headquarters	Field	Total	Headquarters	Field	Total	Headquarters	Field	Total
ES-6	--	--	--	--	--	--	--	--	--
ES-5	2	1	3	2	1	3	2	1	3
ES-4	2	24	26	2	24	26	2	24	26
ES-3	1	1	2	1	1	2	1	1	2
ES-2	1	3	4	1	3	4	1	3	4
ES-1	1	20	21	1	20	21	1	20	21
GS-17	--	--	--	--	--	--	--	--	--
GS-16	6	1	7	6	1	7	6	1	7
GS/GM-15	35	303	338	35	302	337	35	302	337
GS/GM-14	25	615	640	25	612	637	23	610	633
GS/GM-13	73	854	927	73	852	925	69	850	919
GS-12	60	853	913	60	852	912	59	847	906
GS-11	19	716	735	19	715	734	18	712	730
GS-10	--	17	17	--	17	17	--	15	15
GS-9	10	743	753	10	739	749	9	736	745
GS-8	4	212	216	4	209	213	3	208	211
GS-7	29	757	786	29	755	784	27	751	778
GS-6	64	402	466	64	401	465	62	401	463
GS-5	42	956	998	42	955	997	41	951	992
GS-4	24	619	643	24	618	642	23	615	638
GS-3	6	265	271	6	265	271	5	264	269
GS-2	6	80	86	6	80	86	5	80	85
GS-1	--	15	15	--	15	15	--	13	13
Positions at rates Established by Act June 20, 1958 (U.S.C. 3104)....	--	12	12	--	12	12	--	12	12

Permanent Positions by Staff-Year Summary

1983 Actual, 1984 Estimate and 1985 Estimate

Grade	1983 Actual			1984 Estimate			1985 Estimate		
	Headquarters	Field	Total	Headquarters	Field	Total	Headquarters	Field	Total
Grade Established under Foreign National Pay Plan	--	27	27	--	31	31	--	31	31
Ungraded Positions	--	1,033	1,033	--	1,012	1,012	--	962	962
Total Permanent Positions	410	8,529	8,939	410	8,492	8,902	392	8,410	8,802
Staff-Years:									
Ceiling	423	7,912	8,335	350	8,039	8,389	330	7,959	8,289
Non-Ceiling	10	140	150	10	140	150	--	150	150
Total	433	8,052	8,485	360	8,179	8,539	330	8,109	8,439

AGRICULTURAL RESEARCH SERVICE

CLASSIFICATION BY OBJECTS

1983 and Estimated 1984 and 1985

	1983 Actual	1984 Estimated	1985 Estimated
Personnel Compensation:			
Headquarters	$ 12,654,000	$ 10,850,000	$ 10,443,000
Field	216,543,121	228,962,000	233,886,000
11 Total Personnel Compensation	229,197,121	239,812,000	244,329,000
12 Personnel Benefits	27,491,636	29,511,000	30,050,000
13 Benefits for Former Personnel	304,364	--	--
Total Pers. Comp. & Benefits	256,993,121	269,323,000	274,379,000
Other Objects:			
21.0 Travel and transportation of persons	4,738,029	5,090,000	5,340,000
22.0 Transportation of things	1,201,053	1,240,000	1,272,000
23.2 Communications, utilities and other rents	27,147,744	28,040,000	28,491,000
24.0 Printing and reproduction	1,138,741	1,174,000	1,204,000
25.0 Other services	88,028,837	85,197,000	90,595,000
26.0 Supplies and materials	39,898,350	41,234,000	42,283,000
31.0 Equipment	28,269,717	30,377,000	30,425,000
32.0 Lands and structures	12,718,975	22,505,000	6,093,000
41.0 Grants, subsidies, and contributions	3,758,741	25,308,000	2,958,000
Total other objects	206,900,187	240,165,000	208,661,000
Total obligations	463,893,308	509,488,000	483,040,000
Position Data:			
Average Salary, ES positions	$61,050	$63,263	$64,430
Average Salary, GS positions	26,504	27,465	27,972
Average Grade, GS positions	9.06	9.06	9.06
Average Salary of Ungraded positions	21,114	21,879	22,283

NOTE: Includes Regular Appropriation and Buildings and Facilities Appropriation

AGRICULTURAL RESEARCH SERVICE

The estimates include proposed changes in the Language of this item as follows: (new language underscored; deleted matter enclosed in brackets).

Agricultural Research Service

For necessary expenses to enable the Agricultural Research Service to perform agricultural research and demonstration relating to production, utilization, marketing, and distribution (not otherwise provided for), home economics or nutrition and consumer use, and to coordinate and provide
1 program leadership for higher education work of the Department, as provided for by section 1417 of Public Law 95-113, as amended, and section 1419 of Public Law 97-98, and for acquisition of lands by donation, exchange, or purchase at a nominal cost not to exceed $100, [$474,278,000] $481,040,000; Provided, That appropriations hereunder shall be available for field employment pursuant to the second sentence of section 706(a) of the Organic Act of 1944 (7 U.S.C. 2225), and not to exceed $115,000 shall be available for employment under 5 U.S.C. 3109: Provided further, That funds appropriated herein can be used to provide financial assistance to the organizers of international conferences, if such conferences are in support of agency programs: Provided further, That appropriations hereunder shall be available for the operation and maintenance of aircraft and the purchase of not to exceed one for replacement only: Provided further, That of the appropriations hereunder not less than $10,526,600 shall be available to conduct marketing research: Provided further, That appropriations hereunder shall be available pursuant to 7 U.S.C. 2250 for the construction, alteration, and repair of buildings and improvements, but unless otherwise provided the cost of constructing any one building shall
2 not exceed [$120,000] $140,000, except for headhouses connecting greenhouses which shall each be limited to $500,000, and except for ten buildings to be constructed or improved at a cost not to exceed [$220,000] $270,000 each, and the cost of altering any one building during the fiscal year shall not exceed 10 per centum of the current replacement value of the building or [$120,000] $140,000, whichever is greater: Provided further, That the limitations on alterations contained in this Act shall not apply
3 to a total of [$200,000] $220,000 for facilities at Beltsville, Maryland: Provided further, That the foregoing limitations shall not apply to replacement of buildings needed to carry out the Act of April 24, 1948
4 (21 U.S.C. 113a): [Provided further, That the foregoing limitations on construction contained in this Act shall not apply to the establishment of a citrus germplasm clonal repository at Riverside, California: Provided further, That none of the funds appropriated in this Act shall be used to transfer personnel or terminate programs conducted by the Horticultural Insects Research Laboratory at the Ohio State University Agricultural Research and Development Center at Wooster, Ohio: Provided further, That none of the funds appropriated in this Act shall be used to terminate or reduce Federal involvement in research programs conducted at Belle Glade,
5 Lake Alfred or Fort Pierce, Florida.] Provided further, that no funds shall be available in FY 1985 for payment under the Act of August 30, 1890 and the tenth and eleventh paragraphs under the heading "Emergency Appropriations" of the Act of March 4, 1907 (7 U.S.C. 321, et seq.)

Special fund: To provide for additional labor, subprofessional, and junior scientific help to be employed under contracts and cooperative agreements to strengthen the work at Federal research installations in the field, $2,000,000.

Explanation of Changes

The first change is necessitated by an administrative reorganization resulting in transfer of responsibility for higher education to ARS, including operation of the Morrill-Nelson Permanent Appropriation transferred from the Department of Education in section 1419 of Public Law 97-98.

The second change would increase the cost limitation on (1) construction of any one building (except headhouses connecting greenhouses) from $120,000 to $140,000; (2) construction of ten buildings from $220,000 to $270,000 each; and (3) altering any one building during the fiscal year from $120,000 to $140,000.

The construction cost limitation on buildings should be increased in fiscal year 1985 to maintain the previous values of these authorizations. Increases requested are derived from conservative estimates of cost changes applicable in the construction industry and in anticipation of a 10% increase in construction costs in FY 1985.

The third change would increase the cost limitation specifically for Beltsville. This is necessary to maintain the previous values of this authorization. The increase requested is derived from the estimate of construction industry cost changes data as a basis and in anticipation of a 10% increase in construction costs in FY 1985.

The fourth change would delete language exempting construction of the Riverside, California germplasm facility from construction limitations. Further, the language relating to restrictions on transfer of personnel and termination of programs will not be required in FY 1985.

The fifth change would provide language to override the Morrill-Nelson Permanent Appropriation in FY 1985. The ARS appropriation includes $2 million to begin a new program of higher education strengthening grants specifically earmarked for the historically black 1890 institutions, Tuskegee Institute and the University of the District of Columbia.

AGRICULTURAL RESEARCH SERVICE

Appropriation Act, 1984	$476,278,000
Budget Estimate, 1985	483,040,000
Increase in appropriation	+6,762,000

Adjustments in 1984:		
Appropriation Act, 1984	$476,278,000	
Activities Transferred, Net [a/]	-1,519,600	
Adjusted base for 1984		474,758,400
Budget Estimate, 1985		483,040,000
Increase over adjusted 1984		+8,281,600

[a/] Pursuant to Secretary's Memorandum No. 1020-11, on September 1, 1983, the diagnostic functions of the Plum Island Animal Disease Center were transferred from ARS to the Animal and Plant Health Inspection Service. Actual transfer of funds of $4,319,600 were made in 1984. Also, reflected is the permanent appropriation (Morrill-Nelson) transfer of $2,800,000 to ARS from the Department of Education.

SUMMARY OF INCREASES AND DECREASES
(On basis of appropriation)

Items of Change	1984 Estimated	Program Changes	1985 Estimated
Determine genetic variation in biochemical, physiological, and behavioral traits of animals	$ 600,000	+$400,000	$1,000,000
Methods for diagnosing livestock diseases in support of action programs	600,000	+200,000	800,000
Improve genetic resistance of animals to diseases and parasites.	- -	+400,000	400,000
Interdisciplinary experiments on integrated agricultural systems	1,900,000	+600,000	2,500,000
Genetic engineering for modifying germplasm of plants	2,840,000	+600,000	3,440,000
Plant protection research in support of APHIS quarantine programs	9,624,000	+600,000	10,224,000
Research on beneficial insects	3,171,000	+400,000	3,571,000
Methods for maintaining and improving soil fertility	9,758,000	+550,000	10,308,000
Research on soil erosion in support of SCS	3,108,000	+450,000	3,558,000

Items of Change	1984 Estimated	Program Changes	1985 Estimated
Identify the biological and biochemical mechanisms that affect properties of agricultural materials.....	4,000,000	+900,000	4,900,000
Research to control postharvest losses and product quality to enhance exports.....	2,906,000	+800,000	3,706,000
Higher education - 1890 Colleges and Tuskegee Education grants.....	- -	+2,000,000	2,000,000
Higher education - Morrill-Nelson (Permanent Appropriation).....	2,800,000	-2,800,000	- -
Higher education fellowship grants..	5,000,000	-5,000,000	- -
All other.....	428,451,400	+8,181,600a/	436,633,000
Total Available.....	474,758,400	+8,281,600	483,040,000

a/ Proposed increase of $9,057,600 for annualized and absorbed pay increases effective in FY 1984, but which are necessary to carry out the programs proposed for FY 1985; and a decrease of $876,000 for improved efficiencies in administrative support activities and a phased reduction of positions in grades GS/GM 11-15.

Project Statement
(On basis of adjusted appropriation)

Project	1983 Amount	1983 Staff Years	1984 (estimated) Amount	1984 Staff Years	Increase or Decrease	1985 (estimated) Amount	1985 Staff Years
1. Research on animal production efficiency:	$82,223,102	1,598	$82,284,000	1,608	+$2,633,000(1)	$84,917,000	1,589
2. Research on plant production efficiency:	180,657,248	3,568	185,195,400	3,602	+5,552,600(2)	190,748,000	3,559
3. Research on the use and improvement of soil, water and air:							
(a) Research on conservation and use of land and water resources and maintaining environmental quality.....	44,322,076	823	46,570,000	829	+1,794,000	48,364,000	819
(b) Research on watershed development.....	16,378,385	317	17,071,000	308	+300,000	17,371,000	304
Total, Research on the use and improvement of soil, water and air.....	60,700,461	1,140	63,641,000	1,137	+2,094,000(3)	65,735,000	1,123
4. Processing, storage distribution, food safety & consumer services research:							
(a) Processing, storage and distribution efficiency research.....	61,286,152	1,271	64,436,000	1,280	+3,030,000	67,466,000	1,265
(b) Research to improve human health and safety:	24,668,234	500	24,243,000	503	+511,000	24,754,000	497
(c) Research on consumer services...	679,500	19	733,000	19	+16,000	749,000	19
Total, Processing, storage and distribution, food safety, and consumer services research.....	86,633,886	1,790	89,412,000	1,802	+3,557,000(4)	92,969,000	1,781
5. Research on human nutrition.....	31,736,110	252	34,334,000	253	+245,000(5)	34,579,000	250
6. Higher Education:							
(a) Competitive Education Grants.:	--	---	5,000,000	---	-5,000,000	--	---
(b) Morrill-Nelson Funds (Permanent Appropriation)...	2,800,000	---	2,800,000	---	-2,800,000	--	---

Project	1983 Amount	1983 Staff Years	1984 (estimated) Amount	1984 (estimated) Staff Years	Increase or Decrease	1985 (estimated) Amount	1985 (estimated) Staff Years
(c) 1890 Institutions & Tuskegee Education Grants	- -	- -	- -	- -	+2,000,000	2,000,000	- -
Total, Higher Education	2,800,000	- -	7,800,000	- -	-5,800,000(6)	2,000,000	- -
7. Repair and maintenance of facilities and energy retrofit	11,092,000	- -	11,092,000	- -	- -	11,092,000	- -
8. Contingency Research Fund	1,000,000	- -	1,000,000	- -	- -	1,000,000	- -
Unobligated balance	2,303,193	- -	- -	- -	- -	- -	- -
Total available or estimate	459,146,000	8,348	474,758,400	8,402	+8,281,600	483,040,000	8,302
Morrill-Nelson Funds (Permanent Appropriation)	-2,800,000	- -	-2,800,000	- -			
Transfer to Office of the Secretary	+454,000	- -	- -	- -			
Transfer to Animal and Plant Health Inspection Service	+4,280,000	+37	+4,319,600	+37			
Transfer from SRS	-190,000	- -	- -	- -			
Transfer from Office of Minority Affairs	-70,000	-- -	- -	- -			
Total, Appropriation	460,820,000	8,385	476,278,000	8,439			

AGRICULTURAL RESEARCH SERVICE

Explanation of Program

Under the Agriculture, Rural Development and related Agencies Appropriation Act of 1984, Agricultural Research Service carries out the following activities:

1. Research on animal production. -- Research is conducted to improve livestock (including poultry) productivity and to improve the quality of meat and livestock products through improved breeding, feeding, and management practices. Research is conducted to develop methods for controlling diseases, parasites, and insect pests affecting livestock. Research is also conducted on ways to control insects affecting man.

2. Research on plant production. -- Research is conducted to improve plant productivity through improved varieties of food, feed, fiber, and other plants; develop new crop resources; and improve crop production practices, including methods to control plant diseases, nematodes, insects, and weeds.

3. Research on the use and improvement of soil, air, and water. -- Research is conducted to improve the management of natural resources, including investigations to improve soil and water management, irrigation and conservation practices; to protect natural resources from harmful effects of soil, water, and air pollutants, and to improve the environment; and to determine the relation of soil and water to plant growth, including impact on animal and human nutrition. The research includes studies on hydrologic problems of agricultural watersheds, and the application of remote sensing techniques in solving agricultural problems.

4. Processing, storage and distribution, food safety and consumer services research. -- Research is conducted to provide a basic reservoir of knowledge which will stimulate technological development and innovation in the processing, storage, and distribution of food and feeds and thereby improve productivity and reduce costs to the consumer. The research additionally provides support to the regulatory agencies in assuring the quality, safety, and nutrition of food and fiber, and in grading to facilitate movement in commerce and export. Research is conducted to reduce losses in post harvest handling of agricultural commodities including control of insects in storage and quality in export. Research is conducted on utilization of commodities, by-products, wastes and agricultural biomass as chemicals, alternative fuels and other critical materials.

5. Human nutrition research. -- Research is conducted on human nutritional requirements and the composition and nutritive value of food as needed by consumers, and by Federal, State and local agencies administering food and nutrition programs.

6. Higher Education. -- The Agricultural Research Service has an important role identifing areas of shortage in food and agricultural science disciplines and providing leadership to guide students to these areas and improve the overall quality of instruction in the food and agricultural sciences.

The research performed by Agricultural Research Service (ARS) is authorized by the Department of Agriculture Organic Act of 1862 (5 U.S.C. 511), the Research and Marketing Act of 1946, as amended (7 U.S.C. 427, 1621), the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3101, 3222) and the Agriculture and Food Act of 1981, (7 U.S.C. 1281).

JUSTIFICATION OF INCREASES AND DECREASES

(1) An increase of $2,633,000 for research on animal production efficiency consisting of:

(a) An increase of $1,797,000 for the annualization of pay that was absorbed in FY 1984 that is necessary to carry out the program in FY 1985.

(b) A decrease of $65,000 associated with improved efficiencies in administrative support activities and $99,000 associated with a phased reduction of positions in grade GS/GM 11-15.

(c) An increase of $400,000 for research to determine genetic variation in biochemical, physiological, and behavioral traits of animals and devise ways for using the information to accelerate genetic improvement ($600,000 available in FY 1984).

Need for Change. Some progress has been made in identifying genetic variation in certain important substances (e.g. blood antigens, gamma globulins, milk proteins, enzymes) and locating the genes involved on specific chromosomes. However, the information available is very limited and fragmentary.

More information is needed on the substances involved in the regulation of the absorption, assimilation, and utilization of nutrients; lactation; the endocrinological and cellular response to stress; reproduction; growth, including protein synthesis and fat deposition; and defense against diseases, parasites and pests. This research is a prerequisite to development of sophisticated genetic methods to manipulate important factors influencing production efficiency.

Nature of Change. Modern analytical techniques will be used to identify genetic variation in genes that produce hormones and other substances that control physiological processes in animals. Studies will include genetic factors which affect nutrient utilization and absorption, cellulose conversion in ruminants, and fat deposition and protein synthesis.

(d) An increase of $200,000 for developing methods for diagnosis of livestock diseases in support of action programs ($600,000 available in FY 1984).

Need for Change. APHIS depends on ARS to provide research supporting animal disease control and eradication programs in the United States, helping to prevent the introduction of foreign animal diseases and vectors, and providing technology in eradication efforts should the foreign disease agent become established in domestic livestock and poultry populations. International and interstate movement of germplasm, semen, and embryos has become an economically important component of efficient production systems. Certain diseases can be transmitted through these practices.

Nature of Change. Technology will be developed to determine the health status of germplasm, semen, and embryos which may be vectors of domestic and foreign animal diseases, and the means to move germplasm, semen, and embryos which pose minimal risks to disease transmission will be sought.

(e) An increase of $400,000 to undertake genetic research to improve resistance of animals to disease and internal and external parasites ($ -0- available in FY 1984).

Need for Change. In the United States, 15% to 20% of farm animals currently die before reaching market and there is a tremendous loss of productivity caused by subclinical disease conditions. Diseases, arthropods, and parasites that cause these losses at present are controlled largely through the use of chemicals, antibiotics, or vaccines. New methods of controlling livestock diseases, parasites, and arthropod pests are needed such as genetically engineered vaccines and antiserums produced by monoclonal antibody techniques.

Nature of Change. Ways of manipulating the genetic material of both host and parasite will be explored. Use of such technologies as gene isolation, cloning, gene transfer, nucleic acid fingerprinting, and monoclonal antibodies will be explored. An understanding of the biology of African swine fever virus, which causes high mortality in swine and avian influenza, will lead to development of vaccines, predictability of virulence, and better diagnostic tests.

(2) An increase of $5,552,600 for research on plant production efficiency consisting of:

(a) An increase of $3,730,600 for the annualization of pay that was absorbed in FY 1984 that is necessary to carry out the program in FY 1985.

(b) A decrease of $64,000 associated with improved efficiencies in administrative support activities and $314,000 associated with a phased reduction of positions in grades GS/GM 11-15.

(c) An increase of $600,000 for the establishment and operation of interdisciplinary experiments on integrated agricultural systems to validate models and facilitate technology transfer ($1,900,000 available in 1984).

Need for Change. The utility and reliability of complex models and systems must be demonstrated to reduce the high costs and risks of failure associated with the adoption of new technologies by farmers, action agences, and agribusiness. To find the optimum combinations of crops, fertilizers, water management, and pest control for the 10,000 different soils and array of diverse climates across the United States, technologies must be integrated into models of complete operating systems.

Nature of Change. The requested increase will be used to initiate multidisciplinary teams in major physiographic regions. The task for each team will be the development of the best possible farming and ranching systems for the major commodities grown in each region. The overall approach will be to: 1) evaluate thoroughly past and current research for the most promising germplasm, tillage practices, pest controls, and other research results; 2) simulate different combinations of these technologies with the model(s) most appropriate to the region; and 3) assess system outputs such as crop yield and quality, economic returns, soil erosion, and water quality. Most of the expertise needed to implement this proposal is available already; the increased funding is needed to employ systems analysts to set up field experiments, and to coordinate across the different research centers in each region and between regions when needed.

(d) An increase of $600,000 for research on new methods, including genetic engineering, for modifying germplasm of plants ($2,840,000 available in FY 1984).

Need for Change. Genes controlling the metabolic processes involved in yield and product quality must be identified, transferred and expressed in plants. New principles and technologies of biochemistry, physiology, molecular biology, and genetic engineering must be applied to plant germplasm improvement. The pool of genetic variations and knowledge must be increased to meet the expected demands of future domestic and export needs of food and fiber.

Genetic engineering offers promise in crop protection for (a) moving genes for crop resistance against insects, plant pathogens and nematodes into susceptible crop species from resistant plant species; (b) inducing hybrid sterility in insects such as the bollworm/corn earworm; (c) improving effectiveness of predators, parasites, and pathogens; (d) improving pest strains used in autocidal release programs; and (e) improving effectiveness of microbial agents used in controlling plant diseases, and weeds.

Nature of Change. The crop production initiative will (a) devise new genetic methodologies, including genetic engineering, for modifying germplasm by elucidating the biochemical and physiological mechanisms by which genes are regulated and expressed in crop plants; (b) identify genes and/or groups of genes which regulate reproduction, growth, development, and the myriad of agriculturally important traits and plant products; and (c) identify processes that inhibit transfer of genes. This thrust will focus on major agricultural crops.

The crop protection initiative will (a) identify transposable genetic elements and other DNA vectors in the bollworm/budworm and boll weevil, determine tendency of cloned transposable elements to integrate into homologous and heterologous chromosomes, and assess the ability of genes physically linked to these elements to be expressed in transformed individuals and their progeny; and (b) identify individual cells of crops that are resistant to the toxins of plant pathogens and regenerate whole plants from these cells.

(e) An increase of $600,000 to develop technologies needed to assist APHIS in preventing the introduction of alien plant diseases, insects and weeds that threaten U.S. agriculture ($9,624,000 available in FY 1984).

Need for Change. Each year serious pests penetrate U.S. quarantines. Usually federal and state regulatory officials are ill equipped to detect and eliminate incipient infestations on a timely basis because the knowledge of properly identifying the pest may not be known and because no research has been conducted on the pests either by U.S. or foreign scientists that can be used to devise technology for detection and eradication. In addition, the ecological range of adaptation of alien pests in the U.S. is frequently not known and sometimes misjudged.

Nature of Change. The resources would be used to:

- o Determine the biosystematic relations of the bollworm complex, determine if useful forms of hybrid sterility exist, and the mechanisms of chemical communication. This research will lead to improved genetic methods for controlling the corn earworm and tobacco budworm.

- o Discover and develop from promising natural products (plant extracts and fermentation mixtures) and related synthetics, powerful lures for detection and mass trapping of the medfly, the oriental fruit fly, and the melon fly. This technology will allow the detection of incipient insect infestations and improve eradication programs.

- o Isolate, sequence, synthesize, and evaluate insect neuropeptides to broaden the knowledge of these functions in insect metabolism and how these peptides can be manipulated to disrupt behavior and reproduction of crop and livestock pest insects.

- o Develop beneficial fungi and other hyperparasites that subsist and destroy microorganisms that are pathogens of major crops. These include rusts, smuts, and mildew diseases, many of which are exotic in origin, and thus lack natural controls in the U.S. The biology and taxonomy of hyperparasites will be studied, their efficacy improved by genetic manipulations, and technology will be developed to culture and mass produce them. This research will contribute to the control of many destructive plant pathogens and ultimately reduce dependence on chemicals.

(f) An increase of $400,000 to strengthen research to improve the capacity to discover and introduce biological control agents from abroad ($3,171,000 available in FY 1984).

Need for Change. The importation of natural enemies of pests represents a potentially inexpensive means of preventing pest induced losses, without hazard to the environment and with low energy expenditures. In many instances successfully established natural enemies are self-perpetuating and provide adequate protection. In other instances these natural enemies must be mass produced and applied on a recurring basis.

Nature of Change. The near term objectives of this research include the discovery and introduction of natural enemies of poisonous rangeland weeds including leafy spurge and yellow star thistle and of important insect pests such as the bollworm, armyworms, and lygus. The funds will be used to strengthen productive programs located near Paris, France and Rome, Italy.

(3) An increase of $2,094,000 for research on the use and improvement of soil, water and air consisting of:

(a) An increase of $1,213,000 for the annualization of pay that was absorbed in FY 1984 that is necessary to carry out the program in FY 1985.

(b) A decrease of $16,000 associated with improved efficiencies in administrative support activities and $103,000 associated with a phased reduction of positions in grades GS/GM 11-15.

(c) An increase of $550,000 to devise methods for maintaining and improving soil fertility and the chemical and biological properties of soils for optimum crop production ($9,758,000 available in FY 1984.

Need for Change. For at least two decades, inadequate attention has been given to basic research on soil fertility and the chemical and biological properties of soils as they relate to optimum crop production and resource conservation. As crop yield potentials are increased, new research is needed on soil-plant-nutrition relationships so that soil fertility and its management are optimized and do not become barriers to continued increases in future U.S. crop yield levels. New research opportunities have opened up because of recent scientific advances in instrumentation, and improved understanding of soil chemistry, microbiology, biochemistry and plant physiology, and new agricultural production systems including conservation tillage and organic farming.

Nature of Change. The requested increase will be used to establish a coordinated network of ARS projects across the country to investigate biological, chemical, and physical interrelationships within soils comprising a spectrum or variety of agricultural production systems, including organic farming. New research will be directed toward the development of improved understanding of: 1) chemical, biological, and physical factors within the soil, including the role of microorganisms, at the soil-plant-root interface that influence plant nutrient uptake; 2) mechanisms of and factors affecting plant nutrient movement through the soil to the root surface, including the role of environment, soil organic matter, and root morphology; 3) factors influencing root cell membrane permeability, integrity, and function for nutrient uptake and retention; and 4) how agricultural chemicals interact with and influence soil biological, physical, and chemical relationships.

(d) An increase of $450,000 to conduct research in support of the Soil Conservation Service for developing cost-effective technologies for controlling soil erosion on croplands and rangelands ($3,108,000 available in FY 1984).

Need for Change. Despite the rapidly expanding use of conservation tillage by the Nation's farmers and optimistic projections for the future, a number of problems associated with the continuous use of heavy surface residues and of reduced tillage remain unresolved. Weed control and seeding difficulties continue to restrict the use of conservation tillage practices. Groundwater and surface runoff water contamination from use of agricultural chemicals on conservation tilled land are emerging as major problems. The potential for increased use of legumes in conservation tillage systems needs to be explored as a means to reduce nitrogen fertilizer input.

Nature of Change. The requested increase will support an expanded program of research to facilitate the adoption of conservation tillage in the Northern Great Plains with emphasis on methods to improve water storage and efficient use. Because of the special problems associated with developing cost-effective weed and erosion control for soils of the Mississippi Delta, additional research attention will be given to developing double cropping and winter cover cropping systems. On hard pan soils of the Southeast, effective approaches for adapting winter cropping, subsoiling, and controlled traffic technologies to conservation tillage systems will be developed.

(4) An increase of $3,557,000 for research on processing, storage, and distribution, food safety and consumer services research consisting of:

(a) An increase of $2,044,000 for the annualization of pay that was absorbed in FY 1984 that is necessary to carry out the program in FY 1985.

(b) A decrease of $5,000 associated with improved efficiencies in administrative support activities and $182,000 associated with a phased reduction of positions in grades GS/GM 11-15.

(c) An increase of $900,000 to identify the biological and biochemical mechanisms that affect properties of agricultural materials ($4,000,000 available in FY 1984).

Need for Change. The quality and utility characteristics of agricultural products are not easily tailored to meet variable demand of foreign and domestic markets, changes in consumer preference, new technologies for processing, handling and distribution, or expanding knowledge of human and animal nutritional needs. Optimum flexibility to tailor agricultural products to meet changing demands and opportunities in the marketplace must eventually be achieved by precise genetic construction of plants and animals using recombinant DNA technology (genetic engineering).

Nature of Change. The fundamental work in this area will provide needed understanding of external and internal regulatory mechanisms cellular structures, physiological processes and genetic linkages for determining quality of field crops fruit and meat products. The funds will initiate new programs and strengthen productive programs in the following areas:

- o Mechanisms and genetic controllers of plant nutrient partition into major constituents.
- o Timing and duration of plant constituent deposition.
- o Biochemical pathways for desired and undesired constituents.
- o Formation of complex molecular and cellular structures in meats.
- o Trigger mechanisms of fruit ripening.

(d) An increase of $800,000 for research techniques to control postharvest losses and quality to enhance exports ($2,906,000 available in FY 1984).

Need for Change. Foreign movement and trade of large volumes and types of U.S. agricultural products are restricted because of technical problems associated with quality parameters and with infestations or contamination with insects, microorganisms, and/or toxic chemical residues of public health or agricultural concern.

Nature of Change. The funds will be used for new program starts and expansion of effort in the following areas:

- o Develop means to reduce or eliminate cottonseed aflatoxins and microorganism toxins of public health concern in U.S. agricultural product exports.
- o Develop nonchemical alternative quarantine treatment methods for fruit to replace the toxic fumigant Ethylene Dibromide which is now under regulatory constraints.
- o Develop means to reduce meat connective tissue problems and toughness to enhance quality and preference parameters in meat to facilitate major entry of U.S. products into foreign markets.
- o Develop means to enhance the efficiency of cotton ginning and postharvest processing of agricultural fiber products for export.

(5) An increase of $245,000 for research on human nutrition consisting of:

(a) An increase of $273,000 for the annualization of pay that was absorbed in FY 1984 that is necessary to carry out the program in FY 1985.

(b) A decrease of $2,000 associated with improved efficiencies in administrative support activities and $26,000 associated with phased reduction of positions in grades GS/GM 11-15.

(6) A decrease of $5,800,000 for higher education ($7,800,000 available in FY 1984) consisting of:

(a) An increase of $2,000,000 for a new program of higher education strengthening grants for the 1890 Colleges and Universities, Tuskegee Institute and the University of the District of Columbia, under the authorities of Section 1417(a)(2) of P.L. 95-113, as amended, and

(b) A decrease of $2,800,000 for the Morrill-Nelson program ($2,800,000 available in FY 1984).

Need for Change. The Federal government has supported higher education in the food and agricultural sciences at Land-Grant institutions through a permanent appropriation in the Second Morrill Act of 1890. The funding level has remained at the $50,000 level for each state and territory since 1912.

The amount of funds per institution is very small by current day standards, however they continue to be an important part of the budgets at historically black Land Grant institutions. In recent years the research programs and facilities at the Land Grant institutions have been strengthened through the provisions of Sections 1444 and 1445 of P.L. 95-113, as amended, and Section 1433 of P.L. 97-98. A stable funding base for resident instruction is also needed to ensure a strong overall program in the food and agricultural sciences. The proposed $2,000,000 funding will be distributed equally to the 1890 Colleges and Universities, Tuskegee Institute, and the University of the District of Columbia ($111,000 to each). This will be almost triple the $700,000 that these institutions received in Morrill-Nelson funds in FY 1984.

Nature of Change. The Morrill-Nelson permanent appropriation will be temporarily overridden by annual appropriation language. A new grant program for the 18 historically black Land Grant colleges and universities will be implemented. The recipient institutions can use the funds to strengthen the quality of food and agricultural science academic programs (e.g. curriculum development, faculty development, student internships, and scientific instrumentation) and to strengthen student recruitment programs. This increase will contribute toward attracting and preparing outstanding students for careers as food and agricultural scientists and professionals.

(c) A decrease of $5,000,000 for higher education fellowship grants ($5,000,000 available in FY 1984).

Need for Change. Congress first appropriated funds for higher education fellowship grants in FY 1984, under the authority of Section 1417(a)(3) of P.L. 95-113, as amended. These funds will be competitively awarded to colleges and universities to conduct graduate fellowship programs to meet regional and national objectives in the food and agricultural sciences.

The Administration does not support continuation of this program. The Department has an important role identifying areas of shortage in food and agricultural disciplines and providing leadership to guide students to these shortage areas and improve the quality of instruction. However, at a time of such severe Federal funding constraints, funds should not be used to initiate and expand to a meaningful level a new program designed to overcome shortages in particular disciplines. This funding would inevitably compete with other ongoing science and education programs for limited funds. The Department will indirectly fund many graduate students through the $50 million funding level proposed for Competitive Research Grants in the Cooperative State Research Service budget. Recent data indicates that about one-quarter of Competitive Research Grant funds are directly used to hire graduate and post-graduate students to assist in the research. This would result in over $12 million of the proposed Competitive Research Grant funding level being used to support higher education objectives.

Nature of Change. Colleges and universities receiving funds for this program in FY 1984 would be advised to plan for only one year of funding. The institutions would decide how to administer the FY 1984 grants to provide for minimum disruption for students.

STATEMENT OF OBLIGATIONS AND STAFF-YEARS BY LOCATION

(On basis of adjusted appropriation)

Location	Actual 1983		Estimated 1984		Estimated 1985	
	Dollars	Staff-Years	Dollars	Staff-Years	Dollars	Staff-Years
ALABAMA, Auburn.....	2,340,948	47	2,410,400	47	2,590,200	47
ALASKA, Palmer.....	726,077	7	736,100	7	750,500	7
ARIZONA						
Phoenix.....	4,398,141	99	4,686,300	99	4,778,800	99
Tucson.....	3,264,632	75	3,371,900	80	3,438,600	80
Total....	7,662,773	174	8,058,200	179	8,217,400	179
ARKANSAS						
Booneville.....	853,817	9	967,100	11	986,500	11
Stuttgart.....	212,789	3	223,500	4	228,000	4
Total....	1,066,606	12	1,190,600	15	1,214,500	15
CALIFORNIA						
Albany.....	20,581,701	381	19,812,300	367	19,880,300	329
Brawley.....	429,066	11	448,700	10	457,300	10
Davis.....	1,152,751	23	1,140,000	20	1,161,800	20
Fresno.....	2,990,077	61	3,077,800	61	3,268,600	61
Pasadena.....	1,438,442	22	1,388,200	24	1,546,700	24
Riverside.....	2,659,788	63	3,173,800	65	3,234,500	65
Salinas.....	1,503,191	36	1,510,700	35	1,539,600	35
San Francisco.....	3,030,524	15	3,325,900	17	3,329,900	17
Shafter.....	1,033,986	22	1,100,800	23	1,121,800	23
Total....	34,819,526	634	34,978,200	622	35,540,500	584
COLORADO						
Akron.....	737,951	12	720,700	14	735,100	14
Denver.....	1,901,678	47	1,871,600	44	1,997,100	44
Fort Collins.....	5,685,493	107	6,082,400	117	6,752,100	127
Total....	8,325,122	166	8,674,700	175	9,484,300	185
DELAWARE						
Georgetown.....	367,487	9	492,500	11	502,900	11
Newark.....	492,543	13	515,600	13	526,500	13
Total....	860,030	22	1,008,100	24	1,029,400	24
DISTRICT OF COLUMBIA						
Program.....	3,405,382	77	2,930,600	83	2,986,900	83
Headquarters						
Agency Management Services.....	18,050,094	433	16,732,300	360	15,914,900	330
Centrally Financed Program...	10,964,931	- -	10,500,000	- -	10,500,000	- -
Subtotal...	29,015,025	433	27,232,300	360	26,414,900	330
Total.....	32,420,407	510	30,162,900	443	29,401,800	413

STATEMENT OF OBLIGATIONS AND STAFF-YEARS BY LOCATION

Location	Actual 1983		Estimated 1984		Estimate 1985	
	Dollars	Staff-Years	Dollars	Staff-Years	Dollars	Staff-Years
FLORIDA						
Belle Glade	204,384	4	183,400	5	187,300	5
Brooksville	237,637	3	338,000	6	345,100	6
Canal Point	754,318	22	825,700	26	843,000	26
Fort Lauderdale	341,964	9	527,300	9	538,300	9
Gainesville	7,816,931	145	8,126,300	149	8,296,400	149
Lake Alfred	123,222	2	125,900	3	128,500	3
Miami	967,470	27	1,169,400	32	1,193,900	32
Orlando	2,751,360	63	2,715,200	64	2,772,100	64
Winter Haven	907,555	19	961,300	20	981,500	20
Total	14,104,841	294	14,972,500	314	15,286,100	314
GEORGIA						
Athens	9,094,462	193	8,821,000	188	9,960,800	203
Byron	1,698,778	36	1,586,200	35	1,620,300	35
Dawson	1,032,221	24	987,100	26	1,008,300	26
Experiment	298,990	4	427,700	5	436,900	5
Savannah	2,387,088	59	2,539,000	60	2,593,700	60
Tifton	5,630,930	108	6,033,500	115	6,163,000	115
Watkinsville	1,645,365	27	1,600,100	27	1,634,400	27
Total	21,787,834	451	21,994,600	456	23,417,400	471
HAWAII, Honolulu	2,247,666	43	2,306,300	45	2,486,300	45
IDAHO						
Aberdeen	455,971	5	547,700	6	558,500	6
Boise	989,912	18	1,046,600	20	1,067,400	20
Dubois	1,163,758	13	1,000,900	16	1,020,800	16
Kimberly (Twin Falls)	2,088,412	44	2,194,600	45	2,238,200	45
Total	4,698,053	80	4,789,800	87	4,884,900	87
ILLINOIS						
Chicago	83,019	2	- -	- -	- -	- -
Peoria	19,364,809	388	21,785,500	353	21,876,700	327
Urbana	2,608,901	45	2,813,900	48	2,960,400	48
Total	22,056,729	435	24,599,400	401	24,837,100	375
INDIANA						
Lafayette	2,987,642	33	2,907,000	31	3,141,100	31
Vincennes	368,476	8	363,300	8	370,600	8
Total	3,356,118	41	3,270,300	39	3,511,700	39
IOWA						
Ames	14,897,765	316	14,437,700	316	15,327,000	327
Ankeny	423,726	9	514,500	10	525,600	10
Total	15,321,491	325	14,952,200	326	15,852,600	337
KANSAS, Manhattan	3,413,673	67	3,428,500	66	3,504,600	66
KENTUCKY, Lexington	1,426,294	23	1,480,000	22	1,513,900	22

STATEMENT OF OBLIGATIONS AND STAFF-YEARS BY LOCATION

Location	Actual 1983		Estimated 1984		Estimated 1985	
	Dollars	Staff-Years	Dollars	Staff-Years	Dollars	Staff-Years
LOUISIANA						
Baton Rouge	1,403,794	28	1,422,300	29	1,454,200	29
Houma	1,218,756	29	1,307,600	33	1,337,000	33
Lake Charles	323,069	6	337,000	6	344,600	6
New Orleans	21,022,529	378	20,318,600	353	19,717,300	293
Total	23,968,148	441	23,385,500	421	22,853,100	361
MAINE, Orono	486,325	8	645,900	10	658,600	10
MARYLAND						
Beltsville	72,590,955	1,530	76,143,200	1,527	78,668,500	1,492
Frederick	1,893,215	36	1,957,700	37	1,996,200	37
Glenn Dale	454,323	10	558,800	12	569,800	12
Hyattsville	354,898	11	359,900	11	367,000	11
Total	75,293,391	1,587	79,019,600	1,587	81,601,500	1,552
MASSACHUSETTS						
Boston	6,800,383	- -	9,117,900	3	9,119,400	3
Natick	37,136	3	353,300	6	356,400	6
Otis AFB	209,453	3	251,200	2	253,400	2
Total	7,046,972	6	9,722,400	11	9,729,200	11
MICHIGAN, East Lansing	3,000,121	62	2,939,300	63	3,001,800	63
MINNESOTA						
East Grand Forks	448,709	9	397,300	9	405,200	9
Minneapolis	206,698	4	- -	- -	- -	- -
Morris	1,430,694	32	1,384,900	33	1,412,400	33
St. Paul	2,491,648	40	2,269,400	40	2,747,400	53
Total	4,577,749	85	4,051,600	82	4,565,000	95
MISSISSIPPI						
Gulfport	112,591	3	- -	- -	- -	- -
Meridian	273,437	7	- -	- -	- -	- -
Oxford	2,444,818	100	2,604,500	105	2,657,300	105
Poplarville	293,601	55	399,100	67	407,200	67
Mississippi State	4,906,268	6	5,581,300	9	5,694,400	9
Stoneville	6,825,939	164	6,656,300	164	7,456,400	173
Total	14,856,654	335	15,241,200	345	16,215,300	354
MISSOURI, Columbia	4,764,675	90	4,032,000	96	4,113,700	96
MONTANA						
Bozeman	805,301	17	1,029,200	19	1,050,600	19
Miles City	1,259,794	11	1,410,400	12	1,439,600	12
Sidney	841,441	24	- -	- -	- -	- -
Total	2,906,536	52	2,439,600	31	2,490,200	31

STATEMENT OF OBLIGATIONS AND STAFF-YEARS BY LOCATION

Location	Actual 1983		Estimated 1984		Estimated 1985	
	Dollars	Staff-Years	Dollars	Staff-Years	Dollars	Staff-Years
NEBRASKA						
Clay Center	7,352,534	58	6,766,000	62	7,085,200	62
Lincoln	2,371,466	37	2,551,400	42	2,737,800	42
Total	9,724,000	95	9,317,400	104	9,823,000	104
NEVADA, Reno	629,132	11	533,600	11	544,400	11
NEW JERSEY						
New Brunswick	361,318	7	429,100	10	439,400	10
NEW MEXICO						
Las Cruces	1,622,085	29	1,049,300	28	1,072,400	28
NEW YORK						
Geneva	1,177,290	5	374,000	6	381,900	6
Ithaca	3,000,257	39	2,310,200	34	2,446,700	34
Plum Island	10,797,513	263	8,365,900	275	8,781,400	274
Total	14,975,060	307	11,050,100	315	11,610,000	314
NORTH CAROLINA						
Oxford	1,522,376	34	1,427,400	34	1,457,900	34
Raleigh	3,854,528	61	3,821,200	78	3,902,900	78
Total	5,376,904	95	5,248,600	112	5,360,800	112
NORTH DAKOTA						
Fargo	6,979,006	115	6,530,500	123	6,721,100	123
Grand Forks	4,807,985	28	5,325,400	28	5,330,400	28
Mandan	2,145,916	48	2,423,100	50	2,593,100	50
Total	13,932,907	191	14,279,000	201	14,644,600	201
OHIO						
Columbus	160,666	2	195,100	4	199,000	4
Coshocton	872,561	19	816,600	21	832,800	21
Delaware	691,652	13	610,600	7	622,700	7
Wooster	1,537,507	36	1,385,900	34	1,413,600	34
Total	3,262,386	70	3,008,200	66	3,068,100	66
OKLAHOMA						
Durant	1,732,181	44	1,870,400	45	1,907,800	45
El Reno	1,785,184	25	1,386,500	32	1,414,300	32
Lane	- -	- -	- -	- -	176,000	- -
Stillwater	1,418,716	23	1,675,800	31	1,709,400	31
Woodward	813,969	17	661,800	16	675,100	16
Total	5,750,050	109	5,594,500	124	5,882,600	124
OREGON						
Burns	194,411	2	210,500	2	214,700	2
Corvallis	2,358,469	39	2,395,100	39	2,442,800	39
Pendleton	963,870	21	950,100	18	969,000	18
Portland	- -	- -	- -	- -	690,000	19
Total	3,516,750	62	3,555,700	59	4,316,500	78

STATEMENT OF OBLIGATIONS AND STAFF-YEARS BY LOCATION

Location	Actual 1983		Estimated 1984		Estimated 1985	
	Dollars	Staff-Years	Dollars	Staff-Years	Dollars	Staff-Years
PENNSYLVANIA						
University Park	2,512,466	50	2,498,500	49	2,552,400	49
Wyndmoor	14,230,053	284	13,103,000	298	13,915,100	302
Total	16,742,519	334	15,601,500	347	16,467,500	351
SOUTH CAROLINA						
Charleston	1,771,561	48	1,905,400	47	1,945,500	47
Clemson	1,927,356	31	1,671,900	28	1,706,800	28
Florence	1,716,773	41	1,723,900	46	1,760,100	46
Total	5,415,690	120	5,301,200	121	5,412,400	121
SOUTH DAKOTA						
Brookings-Madison	1,521,148	32	1,396,000	36	1,424,200	36
TENNESSEE						
Greenville	22,132	1	52,300	1	53,400	1
Jackson	114,275	3	129,700	3	132,500	3
Knoxville	446,229	10	374,700	9	382,700	9
Lewisburg	138,517	4	146,700	3	149,800	3
Total	721,153	18	703,400	16	718,400	16
TEXAS						
Beaumont	696,748	17	765,900	17	780,600	17
Brownsville	1,218,343	27	1,192,100	30	1,214,900	30
Brownwood	473,355	12	532,600	12	542,800	12
Bushland	2,331,516	36	2,234,600	43	2,277,300	43
College Station	6,985,275	128	6,230,000	127	6,879,400	136
Houston	3,078,551	4	3,344,700	5	3,353,400	5
Kerrville	2,555,013	57	2,794,000	58	2,847,500	58
Lubbock	1,847,132	32	1,866,100	36	1,901,800	36
Temple	2,478,569	49	2,569,000	52	2,618,200	52
Weslaco	4,049,012	87	3,992,300	101	4,068,800	101
Total	25,713,514	449	25,521,300	481	26,484,700	490
UTAH, Logan	3,097,181	61	2,899,500	60	2,959,500	60
VIRGINIA						
Richmond	170,248	5	171,300	5	175,000	5
Suffolk (Holland)	460,105	11	461,100	13	470,900	13
Total	630,353	16	632,400	18	645,900	18
WASHINGTON						
Prosser	1,821,756	40	1,934,600	40	1,974,200	40
Pullman	4,087,628	72	4,259,100	71	4,478,100	71
Wenatchee	842,375	20	968,000	19	987,800	19
Yakima	2,118,849	41	2,125,700	30	2,169,100	30
Total	8,870,608	173	9,287,400	160	9,609,200	160

STATEMENT OF OBLIGATIONS AND STAFF-YEARS BY LOCATION

Location	Actual 1983		Estimated 1984		Estimated 1985	
	Dollars	Staff-Years	Dollars	Staff-Years	Dollars	Staff-Years
WEST VIRGINIA						
Beckley	1,806,547	19	1,977,200	19	2,016,200	19
Kearneysville	2,959,303	23	2,571,300	23	2,623,600	23
Total	4,765,850	42	4,548,500	42	4,639,800	42
WISCONSIN, Madison	3,605,621	43	4,598,600	56	4,782,000	56
WYOMING						
Cheyenne	469,640	13	431,700	15	440,100	15
Laramie	296,013	8	300,800	9	306,700	9
Total	765,653	21	732,500	24	746,800	24
PUERTO RICO						
Mayaguez	1,391,889	33	1,951,600	44	1,990,600	44
Rio Piedras (San Juan)	373,124	8	388,900	7	396,700	7
Total	1,765,013	41	2,340,500	51	2,387,300	51
VIRGIN ISLANDS						
St. Croix	191,980	6	218,000	6	222,400	6
OTHER COUNTRIES						
Argentina, Buenos Aires	173,834	- -	218,700	1	222,700	1
France, Sevres	487,117	2	574,900	9	761,400	9
Italy, Rome	331,188	2	339,600	9	521,800	9
Kenya, Mugaga	191,323	1	142,900	2	145,500	2
Korea, Seoul	119,856	1	125,900	3	128,200	3
Mexico, Tuxtla Gutierrez	798,550	9	882,100	10	898,500	10
Netherlands, Rotterdam	307,824	2	316,100	5	321,900	5
Thailand, Chiang Mai	167,483	1	245,700	- -	250,200	- -
Total	2,577,175	18	2,845,900	39	3,250,200	39

STATEMENT OF OBLIGATIONS AND STAFF-YEARS BY LOCATION

Location	Actual 1983		Estimated 1984		Estimated 1985	
	Dollars	Staff-Years	Dollars	Staff-Years	Dollars	Staff-Years
Extramural and Program locations to be determined.....	4,598,486	- -	3,298,300	- -	3,298,300	- -
Contingency Research Fund.....	a/	- -	1,000,000	- -	1,000,000	- -
Higher Education Grants...	- -	- -	5,000,000	- -	- -	- -
Morrill-Nelson Funds.....	2,800,000	- -	2,800,000	- -	- -	- -
1890 & Tuskegee Grants....	- -	- -	- -	- -	2,000,000	- -
Repair & Maintenance of Facilities and Equipment.....	b/	- -	8,504,000	- -	8,504,000	- -
Energy Retrofit.....	b/	- -	2,588,000	- -	2,588,000	- -
Unobligated Balance.....	2,303,193	- -	- -	- -	- -	- -
Subtotal, Available or Estimate.....	458,770,488	8,347	474,372,400	8,401	482,654,000	8,301
Allotment to Forest Service.....	+375,512	1	+386,000	1	+386,000	1
Transfers from: Statistical Reporting Service.....	-190,000	- -	- -		- -	- -
Office of Minority Affairs.....	-70,000	- -	- -	- -	- -	- -
Morrill-Nelson Funds.....	-2,800,000	- -	-2,800,000	- -	- -	- -
Transfers to: Office of the Secretary.	+454,000	- -	- -	- -	- -	- -
Animal and Plant Health Inspection Service.....	+4,280,000	37	+4,319,600	37	- -	- -
Supplemental for Pay Cost.	- -	- -	- -	- -	- -	- -
Total, Appropriation.....	460,820,000	8,385	476,278,000	8,439	483,040,000	8,302

a/ Obligations for the $1,000,000 appropriated in 1983 are included in the locations above.

b/ Obligations for repair and maintenance $8,504,000, and energy retrofit $2,588,000, in 1983 are included in the locations above.

AGRICULTURAL RESEARCH SERVICE

STATUS OF PROGRAM

Agricultural Research Service (ARS) conducts mission-oriented research to perpetually ensure an abundance of high-quality, nutritious, reasonably priced food and other agricultural products to meet domestic and world needs while maintaining environmental quality. ARS uses coordinated, interdisciplinary approaches to conduct basic and applied research pertaining to livestock, plants, soil-water-air resources, environmental quality, energy, processing, storage and distribution efficiency. food safety and quality, nutrition, consumer service, and agriculturally related health hazards.

Research is conducted at numerous locations in the United States, Puerto Rico, Virgin Islands, and several foreign countries. Much of the research is conducted in cooperation with the State Agricultural Experiment Stations other State and Federal agencies, and private institutions.

RESEARCH ON ANIMAL PRODUCTION

Current activities: The demand for meat and animal products for human consumption continues to increase in the United States, as does the demand throughout the world for animals and animal products from the United States. New technology is needed to enable livestock producers to increase production efficiency to assure a reliable and safe supply of animal protein while at the same time conserving resources and reducing production costs. ARS research is conducted to improve the efficiency of producing healthy animals and safe, high-quality animal products Research emphasizes basic approaches to help meet long-term objectives such as control of pseudorabies, bluetongue, scabies, and ticks; improvement of reproduction through integrated study of pathology, toxicology, physiology, nutrition, and management; conservation of energy on livestock farms; and increased lean meat deposition through understanding and manipulating the cellular processes of protein and fat synthesis.

Research in 1985 will include new approaches in bioregulation such as the identification of genes of animals that are of economic importance and development by genetic engineering of diagnostic tests, reagents, and vaccines for diseases such as bluetongue, African swine fever, pseudorabies, salmonellosia, trichinosis, and coccidiosis Also, research will be conducted on basic strategies to control ticks and mosquitoes and on factors which contribute to screwworm strain deterioration.

Selected examples of recent progress:

Hybridoma research on avian coccidia. Coccidiosis, the most important parasitic disease of poultry, annually costs U.S. producers approximately $150 million from improper growth and feed utilization and another $90 million for medication. Vaccines against this protozoan (single cell animal) infecting the digestive tract are not available. Monoclonal antibodies/hybridomas are being used to provide information needed for vaccine development. Over 600 hybridoma cell lines have been developed that produce specific antibodies directed against various species and developmental stages of the parasite. These monoclonal antibodies have been used to study immunity, inhibition of penetration of host cells by the parasite, dynamics of parasite/antibody interactions, and diagnosis. A Memorandum of Understanding has been established with three commercial companies, whereby they will genetically engineer specific coccidial antigens using monoclonal antibodies developed and supplied by ARS.

Nutrient availability in pregnant beef cattle. Data have been obtained showing the increased needs of protein, energy, and minerals during late gestation. Glucose is a major energy source, but a substantial portion of the total energy used is derived from breakdown of amino acids. Of the total nutrients taken up by the gravid uterus, 70 to 80% are utilized for uterus and placental tissues and only 20 to 30% reach the fetus. Information gained from this research will have broad application in feeding and management strategies for commercial beef production.

Obesity - fatty tissue differentiation. Several clear relationships between the structural aspects of adipose (fat cell) tissue development have been identified. As blood-borne factors such as hormones become increasingly available through development of the blood capillary bed, fat cells respond by decreasing the rate at which they fill with lipid. These studies have application to the long-range goal of increasing efficiency of growth by decreasing carcass fat content and meeting consumer preferences for leaner meat.

Gamma radiation of reference biologicals released from the Plum Island Animal Disease Center. Biological diagnostic reagents that have been produced in the high-containment laboratories at the PIADC are "safety-tested" before the reagents are released to other laboratories. The safety test typically consists of extensive sampling and inoculation on susceptible tissue cultures, small laboratory animals and large domestic animals; serum neutralization studies, clinical observations and other appropriate tests are conducted over a 21-day period. Studies conducted at the PIADC during the past few years have demonstrated the efficacy of exposing diagnostic reagents to gamma radiation. The inactivation of all possible microorganisms is readily achieved, thereby assuring a sterile product. Extensive exposure determinations were done to establish appropriate dose levels and conditions for radiation. Routine treatments are now given at 6 mega rad exposure, keeping the materials frozen at 56C or lower. This dose gives at least a 100-fold margin of safety. Irradiated materials are not released until after the exposed virus sample is shown to be inactivated.

A new and sensitive method for Vitamin D analysis. A highly sensitive, precise analytical technique can accurately measure vitamin D in milk, blood, and tissues of animals and man. Concentrations of vitamin D in blood and tissues previously had to be estimated by inoculating live animals. Use of this powerful new laboratory technique, developed by ARS scientists, opens new research avenues to understanding the role of vitamin D in metabolic diseases of the kidney, bone, and intestine of animals and humans.

Predicting the effect of control methods on insect annoyance, damage, and disease transmission. Data accumulated over many years on the biology, ecology, and dynamics of insect populations, the effects of various control methods on insects, and the development and epidemiology of diseases such as malaria and river blindness have been used to develop a computer simulation technique. The simulation predicts insect population density over extended periods of time and the prevalence and incidence of disease related to the density of insects. Such simulations have been developed for mosquitoes, flies, and ticks, and diseases such as malaria, dengue, and river blindness. Simulations have been adapted to analyzing the effects of various control methods, i.e., pesticides, biological control, attractants, and sterile insect releases, on both the density of insects and the transmission of disease. The simulation technology is ideal for training and educational purposes as well as planning research and operations.

Guidelines developed for genetic evaluation of young boars and gilts. Increases of up to 62% in the accuracy of estimating breeding values for productivity of young sows can be achieved by considering productivity records from the sire's side of the pedigree, in addition to records on the dam. Practical guidelines and examples have been developed for on-the-farm application of recommended procedures for selecting brood sow replacements.

Queen recognition pheromone isolated, identified, and synthesized. Three chemicals have been identified and synthesized as the pheromone which enables worker ants to identify the queen of the colony. Inanimate objects treated with the synthetic pheromone are tended by the workers of the ant nest in a manner similar to the queen. Studies are in progress to determine how the pheromone can be used to enhance control techniques.

Reproductive rate of Senepol-cross cows higher than Brahman crosses. Senepol-cross cows imported in the U.S. from St. Croix exhibit a significantly higher reproductive efficiency rate than Brahman-cross cows. The Senepol-cross cows have exhibited a 10 to 15% higher reproductive rate in all 3 years. Use of these cattle by commercial cattlemen may improve the efficiency of beef cattle production in the Gulf-coast areas of the U.S.

Effects of pregnancy on the immune status of heifers. Blood lymphocytes from heifers in the third trimester of pregnancy have enhanced responses to foreign antigens. This intensified responsiveness is not mediated by serum factors but may reflect pregnancy-dependent alterations of other lymphoid organs such as the thymus or spleen. It appears that third trimester pregnant heifers have a better ability to resist infection than non-pregnant heifers.

Ecological studies of scabies reveal high potential for disease transmission. Studies with scabies transmission among cattle in a feed lot revealed 100% transmission from infected cattle to all exposed cattle. Weight gain of infected cattle was marginally affected if the disease was minimal. When 30% of the animal's body was covered with lesions, weight gain was reduced by 40 lbs over a 3-month period. When 70% of the animal's body was covered with lesions, weight gain was reduced to zero. If left untreated, this could cost the producer from $25-100 per animal.

RESEARCH ON PLANT PRODUCTION

Current Activities: Emphasis is on a balanced research program to discover new knowledge of plant growth and how to protect crops from pests and adverse environments. New technologies will be developed that will ensure an adequate supply of high quality food, feed, and fiber and improve the quality of the environment. Research is designed to discover new knowledge and technologies to solve agricultural problems. Research is in progress to develop new and improved technologies to increase yields, improve crop production efficiency, reduce the costs of production, increase net farm income, solve problems that are barriers to improving our export capacity, and reduce costs to consumers.

Emphasis in FY 1985 will include balanced research on bioregulation of plant processes such as gene function, photosynthesis, nitrogen fixation, stress tolerance, and seed germination. Emphasis in plant protection will be on biology of weeds, nematodes, diseases, and insects to determine their vulnerability to control and to develop ecological, cultural, mechanical, genetic, chemical, and integrated methods of pest control. Systems research

will be emphasized to develop technology to support reduced tillage, conservation tillage, crop rotation, multiple cropping, and other technologies that will reduce soil erosion, and sustain and increase crop yields and quality.

Selected examples of recent progress:

USDA Soybean Germplasm Collection continues to grow. Over 300 soybean (G. max) lines from S. Korea, China, or Japan were added to the northern portion of the USDA Soybean Germplasm Collection. Also, over 50 wild soybean (G. soja) lines were obtained from China. These additions to the collection are from areas of great importance to soybean germplasm and bring the total number in the northern portion of the collection to over 8,000. Interest in the collection by soybean researchers also continues to grow Response was made to nearly 400 requests from approximately 35 states and 25 foreign countries in 1982. This collection will continue to be the foundation for soybean germplasm development in ARS and, thus, serve the U.S. needs.

Tung oil found to increase effectiveness of herbicides. Research has demonstrated that tung oil adds controlled release properties to herbicides. It dries rapidly by polymerization and can be used to encapsulate herbicides directly on the seed coats of crop seeds or in a hard glossy matrix on inert granules. Several herbicides formulated in tung oil and applied directly to the seed coats of crop seeds at extremely low rates per acre have given excellent weed control without crop injury. Other agricultural chemicals such as germination stimulants, fungicides, growth regulators, and biocontrol organisms can also be encapsulated onto the coats of crop seeds or granules using tung oil. The addition of layers of combinations of such active ingredients on the seed coats of crop seeds and controlled-released granules has been achieved. This technology can be practiced by farmers on farms using farm-produced materials, thus greatly reducing costs of transportation and storage. This research demonstrates how the cost of weed control can be reduced, safety of application increased, and the risk of environmental impairments reduced.

Physiological techniques developed for selecting and breeding sugarbeets with higher sugar yields. A sugarbeet hybrid whose male and female parents were selected in the seedling stage for high taproot weights relative to the size of the leaves produced about 15 percent more recoverable sugar per acre in Minnesota and Michigan than the unselected control. The high TLWR hybrid produced more sugar in Michigan than the unselected controls. This development will lead to a more competitive position for the domestic sugarbeet industry.

Genetic engineering on viroid has led to practical commercial use. An inexpensive and extremely sensitive diagnostic test for the presence of viroids in potatoes has been devised. This test is being used on a commercial scale in several countries to ensure disease-free seed potatoes. The new test is based on a reaction that occurs between the viroid present in plant sap and genetically engineered DNA In another line of research on potato spindle tuber viroids, it has been shown that recombinant DNA clones, containing cDNA inserts of the viroid, are infectious. This work on pathogen genetic modification offers a molecular basis for understanding host-pathogen interactions and allows construction of a complete genetic map of the viroid. These technologies will ultimately contribute to new ways of dealing with disease control.

Weeds produce allelochemicals that inhibit the growth of crops and weeds. A member of the pigweed family, Amaranthus palmeri, exudes allelochemicals into the soil that inhibit the growth of onions, carrots, other crops, and several weed species. This research suggests that crop yields may be reduced more by direct effects of chemicals produced by weeds than by shading and competition for water and mineral nutrients. Excellent progress is being made in the isolation, identification, and synthesis of the allelochemicals that are produced by this weed. This research will provide the knowledge needed to counter the adverse effects on crops and to develop naturally occurring herbicides for other weeds.

Rotary cutting of soybeans increases harvesting efficiency. Laboratory tests of high-speed rotary cutting of soybeans in both conventional and narrow row spacings reduced harvest loss levels, compared with conventional sickle-and-guard cutting. This soybean harvesting concept can increase machine capacity, decrease fuel use per harvested acre, and reduce harvest losses for producers, particularly for narrow-row soybeans. Recent advances in weed control technology have accelerated the adoption of narrow-row soybean systems; now more than 20 percent of the total production.

More effective pathogens for control of gypsy moths discovered. By collecting and screening gypsy moth virus isolates from various parts of the world, variants were found that possessed up to 5 times as much pathogenic activity as that of previously studied strains. In addition, it was demonstrated that virus populations varied greatly in ability to resist inactivation by exposure to sunlight. Thus by selection for resistance to ultraviolet light combined with greater virulence, it is possible to develop more effective viral pathogens for control of gypsy moth. These studies have also stimulated further collaborative research relative to improvement of insect viruses by determining the biochemical and genetic basis of virulence thereby permitting the genetic engineering of more effective microbial pesticides.

Identification of hormonal controls that will increase yields of pecans. The hormonal regulation of bud development in pecan trees has been identified. The discovery that most pecan buds from 1-year-old wood can produce flowers and mature nuts indicates that exogenous treatments with the plant hormones cytokinin and gibberellins will induce continued development of buds and female flowers. These flower clusters will be supported by more leaf area and are likely to increase yield. Earlier bud break may possibly allow for earlier nut maturity. It also provides important information relating to methods of inducing continued branch development in mature trees.

Biocontrol of weeds by a fungus is improved by herbicides. The broad spectrum herbicide glyphosate at very low rates of application that did not injure soybeans significantly improved the effectiveness of the fungus Alternaria cassiae for the selective control of the weed sicklepod in soybeans. This research shows not only that herbicides and fungus spores can be used in compatible chemical-biocontrol agent mixtures but that synergistic interactions reduced the amounts of both agents required to control weeds and the cost of control.

New techniques discovered to improve nitrogen-fixing capacity of soybeans. The majority of the biologically fixed nitrogen in soybeans is transported from roots to plant tops as ureides, and the ureide content of soybeans is directly correlated with the nitrogen-fixing capacity of the plant. An improved, automated analysis to measure these and related chemicals in soybean tissues and xylem sap was developed. The automated ureide method will permit an extensive screening of soybean germplasm for selecting plants with higher nitrogen-fixing capacity.

Gibberellic acid improves the effectiveness of herbicides and reduces costs for the control of Canada thistle. Application of the growth regulator Gibberellic acid significantly improved the effectiveness of the selective herbicide bentazon for the control of Canada thistle. The increased effectiveness of bentazon for the control of Canada thistle pretreated with gibberellin is directly correlated with reduced movement of the herbicide from treated leaves, thereby elevating the concentration of the herbicide and its metabolites in the leaf tissue. Research of this type is providing fundamental knowledge on the vulnerability of weeds to chemical and biological control and providing knowledge that enables scientists to increase the effectiveness of herbicides, reduce the amounts required, and reduce the cost of weed control.

Citrus nematode damage reduced by chemically inducing plant tolerance. A chemical to control plant diseases has been found to render trees tolerant to nematode attack. The mechanism by which the chemical induces plant biochemical changes is not yet known, but roots of young trees dipped into this chemical before planting result in much faster tree growth and little or no root damage by nematodes even though the nematodes are not directly killed.

Selection in tissue cultures is a feasible approach for identifying useful genetic variants for crop improvement. Plants resistant to the toxin produced by the fungus Helminthosporium victoriae, which causes victoria blight in oats, were recovered from tissue cultures initiated from a susceptible oat line. All progeny of these plants were also resistant, indicating that the trait is heritable. This is the first example of the selection of a stably inherited trait in oats through the use of tissue cultures and one of the first examples in the cereal crops. This finding further demonstrates the tissue culture approach for identifying useful genetic variants for crop improvement.

Cause of a lethal disease of walnut trees discovered and control now possible. The cause and method of spread of the lethal walnut blackline disease has eluded us for decades. Consequently, it inflicted annual losses of $7 million and was a threat to the entire $200 million walnut industry of California. The cause of the disease is now known to be a virus and its spread into new orchards was found to be through infected seed. These discoveries will now permit an effective means of controlling the disease and its further spread into healthy walnut-producing areas.

New method for predicting durum wheat quality. Recent studies of the endosperm of durum wheats have shown that a particular protein is strongly associated with reduced processing losses in the manufacture of pasta products. A single seed of durum wheat can be cut in half and the protein molecule identified by polyacrylamide gel electrophoresis. The other half of the seed containing the embryo can be germinated and the plant grown to maturity. Thus, plant variants having the troublesome protein at low levels can be selected in segregating generations on a single seed basis. This new method will greatly aid in the breeding of durum wheat varieties with improved qualities and for improved value of wheat products.

Commercial production technique developed for insect pathogens. A production technique which has been developed for the spruce budworm pathogen, Erynia radicans, is adaptable to many other insect pathogens. Mycoinsecticides based on certain groups of insect fungi can now be produced reliably and economically, providing a new approach to spruce budworm and other insect control. ARS has applied for a public patent covering the production process.

RESEARCH ON THE USE AND IMPROVEMENT OF SOIL, WATER, AND AIR

Current activities: Research is conducted to develop technology for using and conserving soil, water, and air resources while sustaining optimum agricultural productivity. Much of this research deals with developing management systems and strategies that optimize the production of food and fiber, minimize the adverse effects of agricultural systems on the environment, and assure the efficient use of our soil, water, and air resources for future generations. Investigations include those aimed at reducing salt damage to soils, crops, and water; improving irrigation and drainage of agricultural lands; developing tillage practices for reducing soil erosion, and for improving soil properties and crop growth; managing and using precipitation and solar energy for crop production; reclaiming and revegetating land areas disturbed by man; utilizing, managing, and conserving soil fertility for increased production and nutritional quality of plants and animals; preventing pollution of and improving the quality of soil, water, and air; controlling erosion by water and wind, and sedimentation and conserving and managing agricultural water resources. Much of these investigations deal with developing an understanding of the basic physical, chemical, and biological processes involved so that the effects of agricultural systems can be accurately interpreted, and models of these systems, which have regional and national application as planning and management tools, can be developed.

In 1985, emphasis will be placed on extending the research that has been directed toward evaluating the effect of erosion on productivity to the development of effective and acceptable conservation production systems. This involves developing an understanding of the basic cause and effect relationships between management practices, crop growth, and conservation. The major goal will be to develop predictive management models to serve as the basis for management decisions by land use planners and farm operators.

Selected examples of recent progress:

Computer control and irrigation scheduling reduce power demands and costs. Radio telemetry and control equipment installed on center pivot irrigation systems was linked to a commercial power company and a weather station in Colorado. Signals sent from the power supplier when electrical demands reached target levels shut off selected systems to reduce peak electric power demand. Daily irrigation schedules and irrigation system priorities were determined from automatic analysis of climatic data. Participation in the load control program saved approximately $6.00/acre in power costs. The monitoring system also saved the farmer 5 hours/day and 100 miles/day normally used for checking, starting, and stopping systems. The system, if adapted for all electric center pivot systems in the U.S., could save an estimated $25 million/year in power costs and improve farmer operating efficiencies.

Soybean yields and stands are severely reduced on eroded Georgia soils. The effect of erosion on soil productivity was determined over a 7-county area in the Southern Piedmont area of Georgia. Results with soybeans show that slightly eroded areas had the highest yields and severely eroded areas had the lowest yields. Yield reductions related to soil loss were about 1.5 bu/inch of soil loss. This knowledge will contribute to a better understanding of the complex crop yield-soil relationships and will lead to development of improved conservation and production practices.

Rangeland model completed. The components of the SPUR (Simulation of Production and Utilization of Rangelands) model were completed and interfaced in preparation for testing, evaluation, and refinement. SPUR considers climate, soils, hydrology, plants, grazing animals and insects, economics, and their interactions. The two versions of SPUR, a pasture scale version and a basin scale version, will provide a wide spectrum of simulations to enhance both management and research in rangeland ecosystems.

Research model shows the benefits of conservation practices in droughty areas. The operational NTRM (nitrogen, tillage, residue management) research model was used in a drought study of the Great Plains area of the U.S. to simulate grain sorghum and wheat growth for a 100-year period under several different management practices to control drought stress. Graphical output predicted the relative impacts of the proposed management practices in a form suitable for use as guidelines. The study demonstrated the relative benefits of conservation practices for long-term production.

Cool season grasses can control saline seeps on fallow land. Saline seeps result from excess water that accumulates when natural vegetation is replaced by cereal grain crops that use less soil water. Results with eight cool season grasses seeded on fallow land showed that after 5 years five grasses had rooted to a depth of 4.5 m and averaged 800 mm of water use from the root zone. While alfalfa seeded on the saline seep recharge area is the most rapid way to bring saline seeps under control, western and intermediate wheatgrasses are also well suited for seeding on recharge areas. This research demonstrates that alternative crops and fallow land rotational systems can be used effectively to manage saline seeps.

Zinc fertilization may protect plants against stress injury. Additional evidence has been obtained that zinc performs the vital function of stabilizing cell membranes. Lack of sufficient Zn bathing plant cells causes them to leak soluble cellular constituents. This newly discovered biochemical function of zinc has important implications for plant production, especially for plants grown on soils marginally deficient in zinc. Large areas of various soil types, world-wide, may lack sufficient zinc to perform this vital function. Thus, the possibility exists that protection against root pathogens, drought injury, cold injury, salt injury, and other root stress injuries in these soil types may be improved by zinc fertilization in excess of those levels normally thought to be adequate.

Crop management influences runoff and erosion from frozen soil. Runoff from frozen soil accounts for 40 to 60 percent of the annual erosion from croplands in the Palouse region of the Pacific Northwest. Research showed that cropping and conservation tillage treatments that enter the winter season with low soil moisture and moderate to large quantities of surface residue had reduced levels of runoff and erosion as compared with conventionally tilled summer fallow. Research also indicated that the relative proportion of frozen soil erosion is reduced significantly by conservation tillage and surface residue management.

Furrow dikes reduce runoff and erosion, and increase crop yields. Eight years of research have generated definitive data to substantiate that furrow diking is a conservation practice that can conserve water, reduce erosion, and increase yields of summer dryland crops grown on flat or gently sloping soils in the Southern Great Plains. Furrow diking conserved as much as 8.8 cm of runoff and increased sorghum yields as much as 1,660 kg/ha. Well constructed furrow dikes can retain up to 5 cm of water in surface storage, thereby increasing infiltration and soil water storage

while reducing soil and water losses. The practice is rapidly being adopted by farmers with an estimated 2.5 million acres diked in 1983.

RESEARCH ON PROCESSING, STORAGE, AND DISTRIBUTION, FOOD SAFETY AND CONSUMER SERVICES

Current activities: The current postharvest science and technology program is targeted to increase the information and knowledge base needed to maximize the use of agricultural products in domestic and export markets. The primary objectives of the program are to increase the quality and uses of agricultural commodities and materials to ensure the safety of agricultural products and workers; to eliminate impediments to commodity export; to reduce losses caused by pests, spoilage, and physical and environmental damage; and to increase the efficiency of processing, handling, and distribution systems.

In pursuit of these objectives, the program in FY 1985 will emphasize research required to increase agricultural exports, and research that responds to the stated needs of action agencies Research will include investigations that provide a more complete understanding of the biological processes in agricultural products and commodities, and that are keys to improving food quality and safety and to reducing losses. For example, understanding the factors involved in the formation of mycotoxins can provide the basis for programs to prevent or control food and feed contamination by these toxins. Research supporting action agency programs will emphasize (1) commodity treatments needed to permit free trade of commodities from areas infested with pests (e.g., Mediterranean fruit fly) and technologies to control insect pests in stored grain and oilseeds; (2) more rapid instrumental and chemical techniques to monitor toxic and drug residues in meat and poultry; and (3) development of the knowledge base needed to control microbial safety hazards in food and ensure the safety of grain inspectors and of grain elevator and textile mill workers. Additional effort will be targeted to supporting export commodity programs; developing innovative pest management systems that will reduce losses during storage, handling, and domestic or export distribution; and developing means to remove constraints upon export, such as control over smut-infested wheat. Resources will continue to be applied to developing the following: information on those constituents and mechanisms critical to determining market quality of commodities and products; new uses for grains and dairy products; new concepts and technologies for converting agricultural commodities, such as soybeans and cottonseed, to acceptable products; and rapid, automated, nondestructive grading technologies to improve the efficiency of the post harvest system.

Selected examples of recent progress:

Bioregulation of specific gene expression in barley Knowledge of gene structure and bioregulation of its activity is the key for introducing the concept of "hormonal balance" as an important trait in crop production and marketing strategy. Seed scientists at Beltsville, Maryland have demonstrated unequivocally that the plant hormone, gibberellic acid, controls the denovo synthesis of alpha-amylase messenger RNA, a first step in producing this enzyme which is so important to malting quality of barley.

Novel process for poultry meat removal. A method to remove the breast and leg meat from noneviscerated poultry in a highly sanitary manner has been developed by scientists at the Russell Research Center in Athens, Georgia. The high labor and equipment costs of evisceration and most of the energy costs for initial carcass cooling would be eliminated if this method were implemented in commercial slaughter plants.

Increased flexibility in processing and use of natural fibers. Traditionally, the cleaning and processing of wool and cotton fibers has required wholly separate technologies. By modifying a cotton carding cleaner, scientists at the Southern Regional Research Center have developed a technique which both removes undesired matter from scoured wool and shortens the wool fibers thus allowing cotton and wool to be processed simultaneously on a single system.

New basis found for segregation of freeze-damaged citrus. Potential loss of quality in consumer products is always an important concern when the citrus crop is damaged by a freeze. Discovery that levels of the compound, hydrogen sulfide, are much different in freeze damaged and undamaged citrus offers an excellent opportunity to develop a rapid means to segregate fruit and mediate any danger of lowering juice quality.

New Types of Leather Coatings. New types of leather coatings polymerized in seconds by ultraviolet light or electron beams have been developed by the Eastern Regional Research Laboratory. The energy and space-saving coating process utilizes special low molecular weight polymers to provide colored leathers with equivalent or better physical properties which unlike current leathers will not degrade in sunlight.

Quarantine treatment research on reduced dosages of ethylene dibromide (EDB) and alternatives are in progress. Laboratory studies indicate half the approved quarantine treatment dosage will reduce the EDB residue in pulp of grapefruit and papaya by at least 50%. Reducing the dosage by half will provide quarantine security for three species of fruit flies in papaya in Hawaii and the Caribbean fruit fly in Florida grapefruit. Degassing time and temperature must be increased simultaneously with any reduction in dosage. Research also shows the following treatments as promising alternatives to EDB: For grapefruit - phosphene, methyl bromide, cold temperature, and radiation; for papaya - phosphene, combination of fruit selection plus hot water dip plus cold treatment, fruit selection plus two hot water dips, and radition.

RESEARCH ON HUMAN NUTRITION

Current activities: Research is being focused on defining required and safe levels of nutrients and other food components for all stages of life. Nutrient needs and tolerances may vary with age, sex, physical activity, genetic differences, and other environmental or host-related factors. Emphasis is placed on the special needs of infants, young children and the elderly and evaluation of nutritional status.

Studies are being conducted on the nutritional composition of foods, biological processes that affect biological availability and utilization, and interactions among nutrients and other dietary components. New techniques and instrumentation also are being developed as needed for these studies.

Knowledge gained about people's nutritional needs at various stages in life, their food consumption patterns, and the nutritive value of the food they eat, is applied in many ways from establishing standards for Government food and nutrition programs to developing guidelines that help people know what foods to eat for a healthful diet.

Selected examples of recent progress:

Iron status affects brain function in humans. Findings in healthy volunteers suggest that iron nutriture and brain function are closely related in humans. Differences were observed in characteristics of brain electroencephalogram (EEG) and cognitive function at adequate and low levels of iron intake in men and women. Differences were observed even among persons whose iron status is considered to be normal by usual standards. Body iron stores (serum ferritin levels) were related to the power and lateralization of the EEG and to the cognitive response of the subject. These findings are important because they provide new insight on the importance of iron status in brain function and suggest that brain function in humans may be adversely affected by suboptimal iron status.

Vitamin B_6 requirement of women higher on animal protein diet. Vitamin B_6 is a generic term for pyridoxine, pyridoxal, and pyridoxamine which occur naturally in foods and are precursors of coenzymes for many of the enzymes of amino acid metabolism. The bioavailability of vitamin B_6 in foods may be significantly affected by heat. In adults, vitamin B_6 deficiency may cause depression, confusion, and electroencephalographic (EEG) abnormalities. In a controlled metabolic study on the requirement of young women for this vitamin, more vitamin B_6 was required when the test diet contained animal protein than when it contained only plant protein foods. The rate of vitamin B_6 depletion, although variable, was more rapid in women than had been observed in men. Two of the women studied exhibited abnormal EEG changes in less than 2 weeks on the vitamin B_6 low diet.

Young infants can digest cereal starches. It is a common belief among pediatricians that young infants lack the ability to digest and utilize cereal starches in the upper intestine. It has been shown through infant feeding studies that cereal starches are digested in the upper intestine and that the colon plays a role in the efficient utilization of dietary carbohydrate. This is a significant contribution to the understanding of the digestive process in the young infant, which may lead to a revision in infant feeding recommendations.

Fructose consumption undesirable for carbohydrate-sensitive people. Fructose is entering the U.S. food supply in increasing amounts as a sweetener in processed foods. Accordingly, a study was conducted to determine the effect of high intakes of fructose on human health, using normal and carbohydrate-sensitive adult human male subjects. It was found that inclusion of fructose into present U.S. diets increased the blood lipids, high levels of which are considered to be a risk factor in heart disease. Glucose tolerance also appeared to be impaired with high fructose levels. Carbohydrate-sensitive men exhibited greater effects than did normal men. The results indicate that individuals who are carbohydrate-sensitive (9-16% in U.S.) should avoid excessive consumption of foods containing high levels of fructose.

Folacin requirements studied in young women. Folacin is a generic descriptor for several structurally related compounds having nutritional properties similar to folic acid. Folic acid serves as a vitamin which functions in several coenzymes essential for nucleic acid synthesis and for normal amino acid metabolism. Several members of the folacin family are present in foods. These different forms possess folic acid activity, but they vary widely in stability, availability, and nutritional effectiveness. The folacin requirement of young women was found to be not less than 300 micrograms per day when supplied from common foods. The individual variability observed suggests that the present Recommended Dietary Allowance (RDA) for folacin may be marginal for some young women.

Mild zinc and copper deficiencies produced in normal volunteers on conventional food diets. Adult human volunteers were fed diets prepared from conventional foods which proficed levels of copper and zinc in the low range that may be present in some self-selected diets. The subjects depleted of zinc displayed marked increases in urinary excretion of the catecholamines, dopamine and norepinephrine. Balances of calcium, magnesium, phosphourous, and copper were affected and utilization of fat for energy was increased. The volunteers depleted of copper exhibited an increase in serum cholesterol and impaired glucose utilization. Animals, deficient in copper, have been found to show many of the features observed in ischemic heart disease, including abnormal lipid metabolism, glucose intolerance, and abnormal electrocardiograms.

Dietary fiber intake lowers blood cholesterol. High levels of serum cholesterol are generally considered to increase the risk of developing heart disease. The intake of diets that lower blood cholesterol without producing any undesirable side effects is therefore desirable. A human study showed that a number of purified dietary fibers, when added to the normal American diet, lowered blood cholesterol in men after 4 weeks. The effective fibers all had the property of forming gels in solution. No undesirable effects of these fibers were observed, such as loss of trace elements from the body. The results indicate that the inclusion of gelling fibers in the diet may be a safe means of lowering blood cholesterol levels.

Regulation of iron-storage protein with aging. As adults get older, they accumulate more iron in their bodies. The iron-storage protein, ferritin, is very important in regulating iron utilization in cells. As part of a study on how the amount of this storage protein is regulated in relation to aging, the ferritin messenger RNA of the rat has been cloned and its amino acid sequence and the corresponding sequence of the ferritin protein has been determined. This allows one to identify the mechanisms controlling expression of the ferritin gene in relation to iron load and the aging process. Iron administration has been shown to favor synthesis of one of the subunits of the ferritin shell which appears to carry the oxidation site necessary for iron storage.

Zinc deficiency retards brain development. Diets mildly deficient in zinc, fed to laboratory rats during pregnancy and suckling periods, caused memory and learning impairments in their offspring. The impaired learning continued into adulthood. The hippocampus areas of the brain were less well-developed in zinc-deficient rats with memory and learning impairments than they were in rats fed control diets. In rats and in humans, the hippocampus normally has high concentrations of zinc, a trace mineral essential for the formation of nucleic acids and protein. These observations by ARS scientists may have implications for humans.

Breast-fed infants consume less energy and protein. Infants, exclusively breast-fed and growing according to national health standards, were found to have significantly lower energy and protein intakes than those reported for formula fed infants. This finding suggests that breast-fed children either have less body fat than bottle-fed children or that energy utilization in these two groups differs substantially. These observations may lead to a re-evaluation of the recommended energy intakes for infants.

Folic acid is poorly absorbed in some elderly. In 30 percent of people over age 60, a condition known as "gastric atrophy" occurs, which reduces the stomach's ability to produce acid. It has been found that the ability of the intestine to absorb the vitamin, folic acid, is markedly reduced (20-40%) in elderly people with gastric atrophy. Absorption of folic acid can be restored to normal (60-70%) if the person ingests diluted acid along with the vitamin. This work suggests that a high proportion of elderly may have an impaired ability to absorb folic acid. This information could lead to increased recommended dietary allowances for folic acid for some groups of elderly people.

AGRICULTURAL RESEARCH SERVICE

The estimates include proposed changes in the Language of this item as follows: (deleted matter enclosed in brackets).

Buildings and Facilities:

[For acquisition of land, construction, repair, improvement, extension, alteration, and purchase of fixed equipment or facilities of or used by the Agricultural Research Service, where not otherwise provided, $27,725,000.]

The change proposes excluding language authorizing acquisitions of land, construction, repair, improvement, extension, alteration and purchase of fixed equipment or facilities at Ames, Iowa; Lincoln, Nebraska; Fargo, North Dakota; Lane, Oklahoma; Corvallis, Oregon; Houston, Texas; Lubbock, Texas; and Blacksburg, Virginia. Language for these activities will not be required in FY 1985.

AGRICULTURAL RESEARCH SERVICE

BUILDINGS AND FACILITIES

Appropriation Act, 1984	$27,725,000
Budget Estimate, 1985	- -
Decrease in Appropriation	-27,725,000

SUMMARY OF INCREASES AND DECREASES
(on basis of appropriation)

Items of Change	1984 Estimated	Program Changes	1985 Estimated
National Soil Tilth Center, Ames, Iowa	$800,000	-$800,000	- -
Metabolism and Radiation Research Laboratory, Fargo, North Dakota	800,000	-800,000	- -
Old West Regional Veterinary School, Lincoln, Nebraska	12,050,000	-12,050,000	- -
South Central Agricultural Research Laboratory, Lane, Oklahoma	375,000	-375,000	- -
Forage Seed Production and Research Center, Corvallis, Oregon	3,200,000	-3,200,000	- -
Children's Nutrition Research Center, Houston, Texas	5,500,000	-5,500,000	- -
Plant Stress and Soil Moisture laboratory, Lubbock, Texas	500,000	-500,000	- -
Virginia-Maryland College of Veterinary, Blacksburg, Virginia	4,500,000	-4,500,000	- -
Total available	27,725,000	-27,725,000	- -

Project Statement

Project	1983 Amount	1983 Staff Years	1984 (est.) Amount	1984 (est.) Staff Years	Increase or Decrease	1985 (est.) Amount	1985 (est.) Staff Years
Construction ARS	$3,297,510	- -	$27,725,000	- -	-$27,725,000	- -	- -
Unobligated balance	2,555,663	- -	- -	- -	- -	- -	
Total available or estimate	5,853,173	- -	27,725,000	- -	- 27,725,000	- -	- -

JUSTIFICATION OF DECREASES

(1) An decrease of $27,725,000 for Buildings and Facilities:

BUILDINGS AND FACILITIES

Need for Change. Funds for these projects are contained in the FY 1984 Continuing Resolution. The funds are available until fully expended and are not required in the FY 1985 Appropriation Act.

Nature of Change. No funds are requested for Buildings and Facilities projects in FY 1985.

Agricultural Research Service
Status of Construction Projects as of December 1983

Status of research facilities authorized in prior years and reported as uncompleted in the 1984 Explanatory Notes, is as follows:

NOTE: Design criteria, provided by ARS, specifies the program requirements for the facility and forms the basis for negotiation of architect-engineer contracts. Diagrammatic drawings or concept drawings provide the basis for the first review of the architect's design. Tentative drawings or architect's design are provided by the architect for firming up cost estimates and basis for developing the completed, and final working drawings.

Location and Purpose	Year	Amount of Funds Provided	Description
Colorado, Fort Collins Animal Disease Center	1979 Plans.....	$ 700,000	Design criteria and diagrammatic drawings were completed in the second quarter of fiscal year 1981.
Iowa, Ames National Soil Tilth Center	1984 Plans.....	800,000	Design criteria and preliminary design shall commence in the third quarter of fiscal year 1984.
Massachusetts, Boston Adult Human Nutrition	1978 Plans.....	2,000,000	Architect-Engineer (AE) contract was awarded in fourth quarter of fiscal year 1978. Architect's design was completed in the fourth quarter of fiscal year 1979. Construction contract for Phase I (site work and excavation) was awarded in the first quarter of fiscal year 1980 and was completed in the fourth quarter of fiscal year 1981. Construction contract for Phase II (laboratory building) was awarded in the third quarter of fiscal year 1981 and completed in the fourth quarter of fiscal year 1982. Phase III (completion of remaining interior spaces) was awarded in the fourth quarter of fiscal year 1982 and completion is projected to be in the second quarter of fiscal year 1984.
	1979 Construction.....	21,100,000	
	1980 Redirection.....	2,187,000 a/	
	1982 Redirection.....	1,490,748 b/	
	1982 Construction.....	5,896,000	
	Total.....	32,673,748	
Nebraska, Lincoln Old West Regional Veterinary School	1983 Plans.....	827,000	Design work will commence in fiscal year 1984 in conjunction with the funding provided by grant to the State of Nebraska. Once design is completed, construction will commence in the third quarter of fiscal year 1984.
	1984 Construction.....	12,050,000	
	Total.....	12,877,000	

Status of Construction Projects as of December 1983 (Cont'd.)

Location and Purpose	Year	Amount of Funds Provided	Description
New York, Plum Island Additional Animal Laboratory Facilities	1973 Plans	$ 250,000	Construction of the laboratory additions was halted in March 1979 due to contractor default. The entire project consists of completing the Vaccine Storage Warehouse, Entry and Change Facility, Animal Facility, and the Diagnostic Research Laboratory and mothballing the Vaccine Research Laboratory. A contract was awarded in the second quarter of fiscal year 1980 for construction management services for the assessment and for the design and construction of the laboratory additions. The assessment of in-place construction and the construction of the Vaccine Storage Warehouse were completed in the fourth quarter of fiscal year 1981. Construction of the Entry and Change Facility was completed in the third quarter of fiscal year 1983. Construction of the initial phase of the Animal Facility was completed in the third quarter of fiscal year 1983. Design of the remaining phases on the Animal Facility and the Diagnostic Research Laboratory was awarded in the second quarter of fiscal year 1982. Construction of the Animal Facility is projected to be completed by the fourth quarter of fiscal year 1985. Design of the Diagnostic Research Laboratory is complete and is being segmented to insure that the base bid will provide an operational facility within available funds. Construction is projected to start in the third quarter of fiscal year 1984 and is projected to be completed by the second quarter of 1985. Critical elements for the mothballing of the Vaccine Research Laboratory were accomplished in the fourth quarter of fiscal year 1983. Design for the completion of the mothballing operations will be deferred until after award of the Diagnostic Research Laboratory construction contract.
	1976 Construction	10,000,000	
	1977 Redirection	294,000 c/	
	1977 Redirection	700,000 d/	
	1978 Redirection	900,000 e/	
	1981 Construction	10,100,000	
	Total	$22,244,000	

Status of Construction Projects as of December 1983 (Cont'd.)

Location and Purpose	Year	Amount of Funds Provided	Description
North Dakota, Fargo Metabolism & Radiation Laboratory	1984 Plans.....	$ 800,000	Design criteria and preliminary design will commence in fiscal year 1984.
Oklahoma, Lane Integrated Small Farm Production System	1983 Plans..... 1984 Plans and Construction.... Total.....	350,000 375,000 725,000	Design criteria and preliminary design will commence in fiscal year 1984.
Oregon, Corvallis National Forage Seed Production Research Center	1983 Plans..... 1984 Construction..... Total.....	750,000 3,200,000 3,950,000	Selection of an AE will be made in the second quarter of fiscal year 1984 and design will begin immediately. Construction will commence in the third quarter of fiscal year 1984.
Texas, Houston Children's Nutrition Research Center	1984 Plans.....	5,500,000	Design criteria and design will commence in the third quarter of fiscal year 1984.
Texas, Lubbock Plant and Moisture Stress Laboratory	1978 Feasibility Study. 1979 Plans..... 1984 Plans..... Total.....	100,000 800,000 500,000 1,400,000	AE contract for design criteria document was awarded in the second quarter of fiscal year 1980 and completed in the fourth quarter of fiscal year 1980. The design contract for the central laboratory was awarded in the fourth quarter of fiscal year 1980 and was completed in the first quarter of fiscal year 1982. Design of the remaining facilities will be accomplished in the fourth quarter of fiscal year 1984.

Status of Construction Projects as of December 1983 (Cont'd.)

Location and Purpose	Year	Amount of Funds Provided	Description
Texas, Mission Fever Tick Research	1982 Plans and Construction....	$ 700,000	Design was completed in the third quarter of fiscal year 1982. Construction contract was awarded in the fourth quarter of fiscal year 1982 and was completed in the fourth quarter of fiscal year 1983.
Virginia, Blacksburg Virginia-Maryland Regional College of Veterinary Medicine	1984 Construction.....	4,500,000	Preliminary design, including the diagrammatic or concepts drawings, is partially completed. Design is projected to be completed in the fourth quarter of fiscal year 1984. Construction is projected to be awarded in the fourth quarter of fiscal year 1984.
West Virginia, Beckley Soil and Water Conservation Research	1972 Plans..... 1973 Construction..... 1976 Redirection..... 1977 Redirection..... 1981 Construction..... Total.....	70,000 700,000 40,000 f/ 1,509,000 d/ 1,000,000 3,319,000	Construction contract was awarded in the third quarter of fiscal year 1978 and was completed in the second quarter of fiscal year 1980. Additional funds in fiscal year 1981 were provided to construct facilities to protect research equipment. Construction contract for storage buildings was awarded in the first quarter of fiscal year 1982 and completed in the second quarter of fiscal year 1983.
West Virginia, Kearneysville Fruit Crops Research	1973 Plans..... 1976 Construction..... 1977 Redirection.....	200,000 7,570,000 -2,209,000 d/ 5,561,000	AE contract was awarded in the first quarter of fiscal year 1974, and design was completed in the fourth quarter of fiscal year 1976. Construction contract was awarded in the second quarter of fiscal year 1977 and was completed in the fourth quarter of fiscal year 1979. Additional facilities were completed in fiscal year 1983. Award of contract for the purchase and installation of the remaining scientific equipment is expected in fiscal year 1984.

Status of Construction Projects as of December 1983 (Cont'd.)

Location and Purpose	Year	Amount of Funds Provided	Description
Wisconsin, Madison Dairy Forage Research Center	1978 Plans 1979 Construction Total	$ 1,000,000 9,000,000 10,000,000	This facility is located on Baraboo field site (military base). AE contract was awarded in the fourth quarter of fiscal year 1978, and design was completed in the third quarter of fiscal year 1979. Construction contract was awarded in the fourth quarter of fiscal year 1979 and construction was completed in the fourth quarter of fiscal year 1980. Construction contract was awarded in the first quarter of fiscal year 1982 for additional support facilities and construction was completed in the fourth quarter of fiscal year 1982. Construction contract for the second residence was awarded in the fourth quarter of fiscal year 1983 and is projected to be completed in the third quarter of fiscal year 1984. University of Wisconsin campus site: drawing received the first quarter of fiscal year 1979. Architect's design was completed in the fourth quarter of fiscal year 1979. Construction contract was awarded in the first quarter of fiscal year 1980 and construction was completed in the third quarter of fiscal year 1981.

Status of Construction Projects as of December 1983 (Cont'd.)

Footnotes:

a/ Program funds in the amount of $2,187,000 were reprogrammed to fund additional costs for this project.

b/ Program funds in the amount of $1,490,748 were reprogrammed to fund additional costs to purchase building equipment for this project.

c/ $194,000 was redirected from the air pollution abatement and sewage treatment project to provide funds for pollution abatement facilities in the animal and laboratory project as originally planned. An additional $100,000 has been redirected into the animal and laboratory project from program funding.

d/ Due to cost escalation and to provide funds to complete facilities as originally planned and designed at the Beckley, West Virginia project and the Plum Island animal and laboratory project, funds in the amount of $2,209,000, were redirected from Kearneysville, West Virginia. $1,509,000 was transferred to Beckley and $700,000 to PIADC.

e/ Program funds in the amount of $900,000 were reprogrammed to fund additional costs for this project.

f/ Due to cost escalation, funds in the amount of $40,000 for the Ithaca, New York, project were redirected to Beckley, West Virginia, to construct the facility.

AGRICULTURAL RESEARCH SERVICE

Passenger Motor Vehicles

The 1985 Budget Estimate does not include the purchase of additional passenger motor vehicles above the 472 passenger motor vehicles presently owned.

The passenger motor vehicles of this Agency are used almost exclusively by professional research investigators and technical personnel. In the course of their daily work these personnel may need to travel to individual farms, ranches, commercial firms, State agricultural experiment stations, etc, requiring a high degree of mobility. Use of common carriers are seldom feasible.

It is the policy of the ARS to pool the use of motor vehicles for different activities in order to keep the number of vehicles to a minimum and reduce maintenance cost. Monthly vehicle operation reports and periodic surveys are maintained to determine utilization and condition of the motor vehicles.

Replacement of passenger motor vehicles. It is proposed to replace 118 of 472 vehicles (including 8 buses) currently in operation. These vehicles are located at field stations and are used in connection with research studies and technical assistance. All vehicles proposed for replacement have more than 60,000 miles or are more than 6 years of age.

Age and Mileage Data for passenger-carrying vehicles on hand as of September 30, 1983.

Age-Year Model	Number of Vehicles*	Percent of Total	Lifetime Mileage (thousands)	Number of Vehicles*	Percent of Total
1978-older	241	51	80-over	44	9
1979	39	8	60-80	73	16
1980	68	14	40-60	134	28
1981	55	12	20-40	130	28
1982	28	6	Under 20	91	19
1983	41	9			
Total	472	100		472	100

*Includes 6 vehicles used in foreign countries, and 8 buses.

Aircraft

There will not be any additional acquisitions or replacement of the seven aircraft owned by ARS in FY 1985. The aircraft reported at Yakima, Washington in FY 1984 have been transferred to College Station, Texas. All of our aircraft are now located at College Station, Texas, and Weslaco, Texas. They are used in control methods, application of agricultural materials, and infrared and color photography, and evaluating efficiency affects on weather conditions.